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Some Beautiful Indian Trees

Bale and Curnow

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The Noble Amherstia Tree
(*Amherstia nobilis*).

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VARIEGATED BAUHINIA.

Bauhinia variegata Linn.

(about ½ nat. size.)

ACC No 3509

THE VARIEGATED BAUHINIA.

BAUHINIA VARIEGATA LINN.

The name *Bauhinia* was given in honour of John and Caspar Bauhin, sixteenth century herbalists, the twin leaflets suggesting two brothers. Belongs to the family *Caesalpiniaceae*.

Description.—A medium-sized tree with dark-brown, nearly smooth, bark. The young shoots are covered with a brown pubescence. The leaves, which are shed during the cold weather, are 4 to 6 in. long, as broad or broader than long, with a median cleft reaching from $\frac{1}{4}$ to $\frac{1}{3}$ the way down into the blunted lobes. When young they are minutely hairy but with age this character is lost except along the nerves and their axils; their texture is slightly leathery, the base is usually deeply heart shaped, there are 11 to 15 nerves; the stalks vary from 1 to $1\frac{1}{2}$ in. long. The flowers are large, fragrant, white or purplish, appearing when the tree is leafless; they are disposed in short, few-flowered, grey pubescent racemes at the ends of the branches or in the axils of the leaves; the flower stalks are short or absent with bracts and minute bracteoles which are slightly hairy and deltoid in shape. Calyx tube slender $\frac{1}{2}$ to 1 in. long, the limb spathe-like, as long as the tube and 5-toothed at the apex, softly grey-haired. Petals 2 to $2\frac{1}{2}$ in. long, obovate, with long rather broad claws, all white or 4 petals pale-purple and the fifth darker with purple veins. Stamens 5 fertile, no staminodes. Ovary softly hairy along the sutures, long-stalked; style long; stigma head-like. Pods 6 to 12 by $\frac{3}{4}$ to 1 in., hard, flat, dehiscent or a hairless stipe 1 in. long. Seeds 10 to 15.

This beautiful tree has flowers of varied colours, pink, white and mauve splashed with purple. The white flowering form (*candida*) is also common and is very striking with a yellow splash at the base of one or more petals. These trees flower from December to March or April. Mr. C. M. Tembe, Superintendent of H.H. The Maharaja Holkar's garden at Indore, The Manik Bagh, says: "This tree is planted largely there in gardens and avenues for ornamental purposes."

Distribution.—Found wild in the sub-Himalayan tract from the Indus eastwards, Assam, Burma, Chota Nagpur, Central Provinces, Western Peninsula. Cultivated largely. Wild also in China.

Gardening.—Often cultivated in gardens and will sometimes flower in its second year as a shrub. It thrives in a variety of soils. They delight in high well-drained land. It is very tender and easily affected by low temperatures. No particular care in tillage or fertilizing is necessary, but better bloom is secured if some attention is given to these details. Cuttings root with difficulty.

Flowering, leaf-shedding and fruiting.—The leaves commence

VARIEGATED BAUHINIA
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falling in November to December, and the tree is leafless or nearly so by March ; the new leaves appear in April and May. The large pink to purple or white flowers appear from February to April, chiefly on the upper leafless branches, the lower branches often being still in leaf. The flowers are fragrant and are visited by bees, by whose agency pollination is effected. The pods form rapidly, ripening in May and June (Northern India) ; they are 6 to 12 by $\frac{7}{10}$ to 1 in., hard and flat, with 10 to 15 seeds, and dehisce for the most part on the tree, scattering the seeds. The seeds are $\frac{1}{2}$ to $\frac{3}{4}$ by $\frac{1}{2}$ to $\frac{7}{10}$ in., nearly circular, flat, brown, with a somewhat coriaceous testa, 70 to 100 weighing 1 oz. ; they germinate readily and show a high percentage of fertility, which is retained to some extent for at least a year (Troup).

Natural reproduction.—The seeds, which are scattered before the beginning of the monsoon, germinate readily when the rains begin, and germinating seeds may be found in quantity round the trees. But unless the seed happens to become buried in earth and débris, or is sheltered from the sun, most if not all of the young plants may die off owing to the drying up of the radicle if exposed to the sun, while birds and insects also cause a good deal of mortality by eating off the radicles. The most favourable condition for the establishment of reproduction appears to be the presence of loose porous well-drained soil, in which in the first place the seed has a chance of becoming covered with earth, and in the second place the seedling develops sufficiently rapidly to overcome weed-growth (Troup).

Artificial reproduction.—The most successful means of raising the tree artificially is by sowing in lines in which the soil has been well loosened, followed by regular weeding and loosening of the soil. Unless regular watering can be carried out, transplanting is difficult except in the case of small plants during the first rains. The seed should be sown in May in drills 9 to 10 in. apart ; the young plants usually appear in 4 to 10 days, and may be transplanted while still comparatively small during the first rains. Trees planted for ornament may be kept a second year in the nursery, but regular watering is necessary in the dry season following transplanting ; in this case either the seedlings should be pricked out in the nursery during the first rains or the drills should be at least 12 in. apart, and the seedlings should be thinned out where necessary (Troup).

Economic value.—The plant is of value for decorative purposes.

The tree yields a gum with the properties of Cherry gum. The bark is used in tanning and dyeing ; it yields a fibre.

The leaves are made into cigarette covers.

The seeds are said to yield an oil.

The wood is grey and moderately hard, with irregular masses of darker and harder wood in the centre. It is hard and serviceable, but seldom of large size ; it weighs 33-48 lb. per cubic foot. It is used for making agricultural implements and for fuel.

Domestic uses.—The leaves, the flowers, the flower-buds, and the young pods are eaten as a vegetable ; the flower-buds are often pickled.

Medicinal properties and uses.—Almost every part of the plant is used medicinally in India.

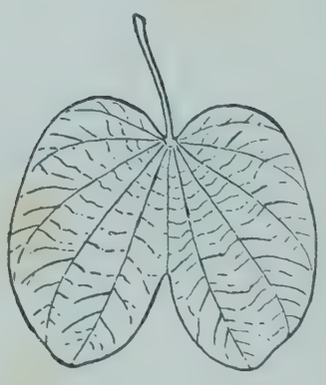
Sacred uses.—The tree is often seen on Buddhistic sculptures.

Popular names. —*Almora* : Keorab ; *Bengal* : Bidul, Kovidara, Lalkangchan, Raktakanchan, Vagakangchan, Yugapatra ; *Berar* : Kachnag, Kachnar, Kanchan ; *Bhumij* : Kandol, Kundol ; *Bombay* : Kanaraj, Kanchan, Kovidara ; *Burma* : Bwaycheng, Bwechin ; *Canarese* : Arisinantige, Ayata, Bilikanchivala, Bilikanjivala, Irkubalitu, Kanjivala, Karalabhogi, Kempukanjivala, Kempumandara, Mandara, Ulipe ; *Central Provinces* : Kachnar ; *Dehra Dun* : Kachnar ; *English* : Variegated Mountain Ebony ; *French* : Arbre de Saint Thomas, Bauhinie panachée ; *Hindi* : Barial, Gurial, Gwiar, Kachnar, Kandan, Kaniar, Khairwal, Khwairaal, Koliar, Kural, Padrian ; *Jaunsar* : Gorias ; *Khond* : Kopu ; *Kolami* : Buj, Burunga, Juruju, Singya ; *Konkani* : Kanchan ; *Kotra* : Kachnal ; *Kumaon* : Guiral, Kuiral ; *Lambadi* : Jhinjero ; *Lepcha* : Rha ; *Malayalam* : Kovidaram, Suvannamandaram, Unna ; *Marathi* : Kanchan, Raktakanchan, Thaur ; *Mechi* : Kurmang ; *Melghat* : Champa ; *Mundari* : Burju, Buruju, Jantai ; *Nepal* : Taki ; *Nimar* : Kachnar ; *Sanskrit* : Ashmantaka, Champavidala, Kanchana, Kovidara, Uddalaka, Yugapatraka ; *Santali* : Jhinjir, Jingya ; *Saora* : Boda, Rovilara ; *Tamil* : Mandarai, Segappumandarai, Semmandarai, Vellaippuvatti ; *Telugu* : Bodanta, Devakanjanamu, Kanjanamu, Mandara, Mandari ; *Urdu* : Kachnal ; *Uriya* : Boroda, Kanjoni, Kosonaro, Rongakonjono.

The Variegated Bauhinia can easily be mistaken for another beautiful tree often grown in Indian gardens, the Purple Bauhinia (*Bauhinia purpurea*)—described on the next page.

THE PURPLE BAUHINIA.

BAUHINIA PURPUREA Linn.



Description.—A medium-sized tree with nearly ashy to dark-brown bark, leafless during the cold season, young parts clothed with brown pubescence. Leaves 3 to 6 in. long, rather longer than broad cleft about half way down into 2 pointed or rounded lobes, very minutely hairy beneath when young, base usually heart-shaped, 9 to 11 nerved ; leaf-stalks 1 to 1½ in. long. Flowers large, rose, purple, disposed in few-flowered panicles at the ends of the branches, the panicles are covered with a brown tomentum, stalks ⅓ to ½ in. long, stout and covered with a powdery substance ; bracts and bracteoles small, tomentose, deltoid. Calyx tomentose, tube $\frac{3}{10}$ to $\frac{2}{5}$ in. long, the limb twice as long as the tube usually splitting into 2 reflexed segments, one irregular margined, the other 3-toothed. Petals 1½ to 2 in. long, oblanceolate, long-clawed, spreading veined. Stamens usually 3 fertile, the others reduced to antherless filaments. Ovary downy, long-stalked, style long, stigma large and oblique. Pod 6 to 10 by $\frac{3}{5}$ to $\frac{4}{5}$ in. on a tomentose style, $\frac{3}{5}$ to 1 in. long, linear, flat, pointed, greenish tinged with purple till ripe, breaking up late. Seeds 12 to 15, almost round, flattened, ½ in. in diameter, dark-brown, smooth.

It grows sparingly throughout India and China and is cultivated in most parts of India.

Flowering and fruiting.—The terminal panicled racemes of large purple, deep-rose to lilac flowers appear amongst the foliage from September to December The flowers are very fragrant, and are visited by numerous bees, by whose agency pollination is effected. The pods form rapidly, some attaining a fair length while the tree is still in flower ; they ripen from January to March, and are then greenish-purple, 6 to 12 by $\frac{7}{10}$ to 1 in. flat, fairly thick, pointed, slightly falcate, with coriaceous valves, containing 10 to 15 seeds. The seeds

Photo by T. D. Srinivasan.

The Purple Bauhinia (*Bauhinia purpurea* Linn.). Branch with flower and fruits.

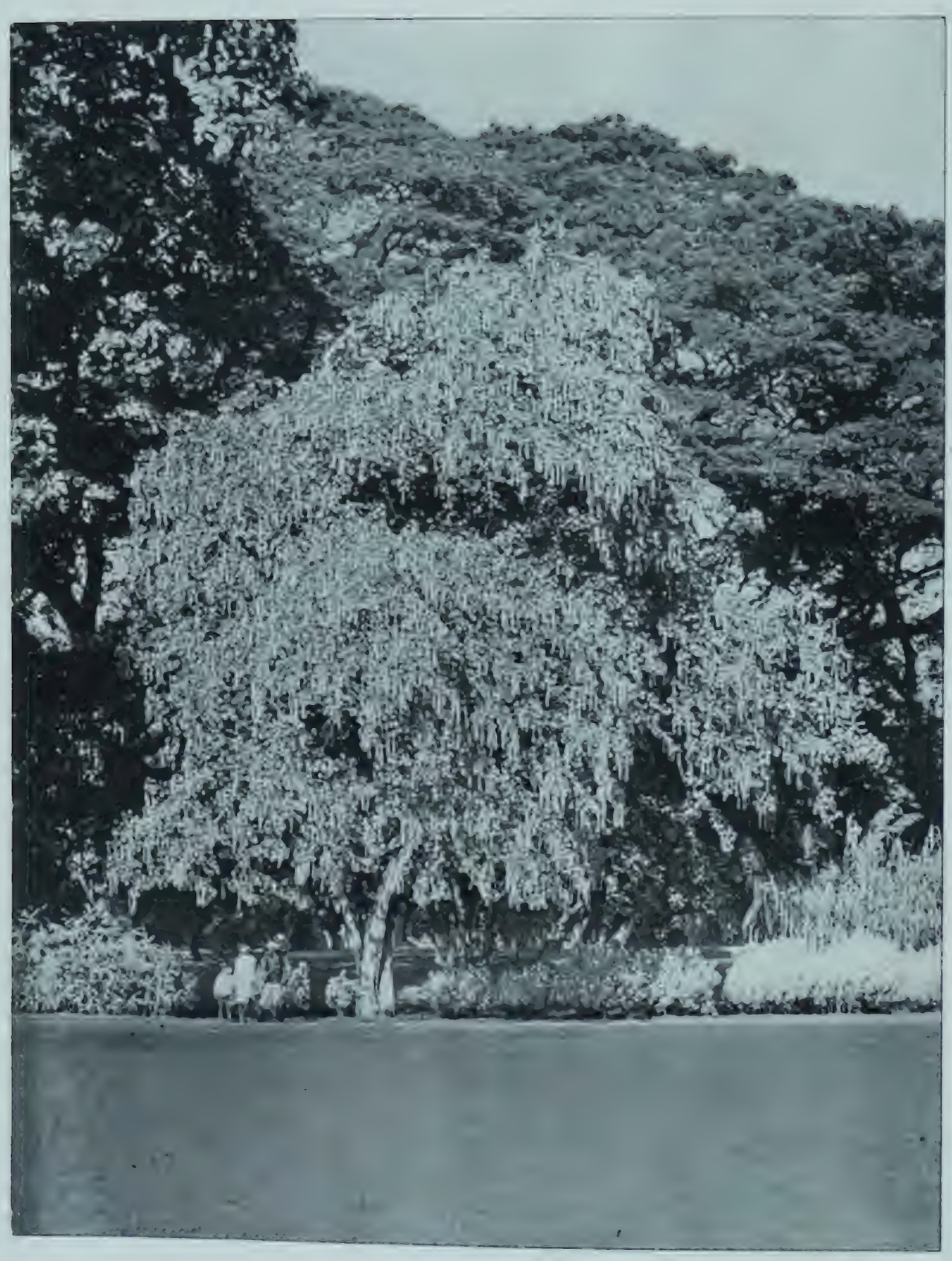


Photo by T. D. Srinivasan.

The Purple Bauhinia (*Bauhinia purpurea* Linn.). Tree full of young fruits. (Royal Botanic Garden, Sibpur, Calcutta.)

are brown, compressed, $\frac{3}{5}$ by $\frac{1}{2}$ in. They germinate readily and have a high percentage of fertility, which they retain unimpaired for at least one year ; tests at Dehra Dun with seed kept for 14 months showed a fertility of 100 per cent. The pods dehisce on the tree during the hot season, scattering the seeds (Troup).

Natural reproduction.—The seeds germinate readily at the beginning of the rains, when numerous young seedlings may be found in the neighbourhood of seed-bearers. Where germination takes place on the surface of the ground, however, much mortality occurs owing to the drying up of the radicle if exposed to the sun. The survival of the seedlings is greatly facilitated if the seed becomes buried in loose earth before germination and the roots of the young plant are not exposed (Troup).

Artificial reproduction.—Experiments at Dehra Dun have shown that the best results are attained by line sowings kept regularly

weeded ; irrigation also has a marked effect on the growth. The seedlings are somewhat sensitive to transplanting, which has to be done with care. The seed should be sown in the nursery in April or May in drills 9 to 10 in. apart, and covered to a depth of about $\frac{1}{4}$ in., regular watering, and weeding being carried out. The seedlings appear in about 4 to 10 days, and can be transplanted while still of small size during the first rains. Transplanting with unpruned stem and roots should not be attempted during the second rains unless regular watering is possible for some time. A certain amount of success has been attained by transplanting after pruning the stem and tap-root down to 2 and 9 in. respectively, but this checks the growth severely for a time (Troup).

Economic value.—The tree yields a gum. The bark is used for dyeing and tanning ; it yields a fibre. The leaves are given to cattle as fodder.

The wood is pinkish-white, turning dark brown on exposure, moderately hard, weighs 40 to 50 lb. per cubic foot ; used for the making of agricultural implements and for building purposes.

Domestic uses.—The flowers are used as a potherb in curries, and they are also made into pickles.

Medicinal properties and uses.—The root is tonic and carminative, the flowers laxative, and the bark astringent. A decoction of the bark is recommended as a useful wash in ulcers.

The bark or root and the flowers, mixed with rice water, are used as a maturant for boils and abscesses. The Mundas apply the root on cuts and bruises.

The bark of the underground root is poisonous even in a small quantity.

Popular names.—Bengal : Devakanchan, Koiral, Raktakanchan ; *Bhil* : Kanchana, Kenchna ; *Bombay* : Atmatti, Devakunchun, Ragtakanchan ; *Burma* : Mahahlegani ; *Canarese* : Basavanapadu, Kanchivala, Kanjivala, Kempukanjivala, Kempumandara, Sarul, Ulipe ; *Dehra Dun* : Khairwal ; *Garhwal* : Guiral ; *Gond* : Kodwari ; *Hindi* : Gairal, Kaliar, Kandan, Kaniar, Karar, Khairwal, Koilari, Koinar, Koliar, Sona ; *Ho* : Sing'a ; *Kharwar* : Koinar ; *Khond* : Kopu, Soveri ; *Kolami* : Buruju ; *Koya* : Godetta ; *Kurku* : Koliari ; *Lepcha* : Kachik ; *Lohardugga* : Koinar ; *Malayalam* : Suvannamandaram ; *Mal Paharia* : Kundrau ; *Marathi* : Atmatti, Devakanchana, Ragtachandan, Raktakanchan ; *Mundari* : Singara ; *Nepal* : Khwairalo ; *Punjab* : Karalli, Karar, Koiral, Kolar ; *Reddi* : Godugura ; *Saharanpur* : Khairwalpapri ; *Sanskrit* : Raktapushpakovidara, Vanaraja ; *Santali* : Singyara, Sinhara ; *Saora* : Boda ; *Tagalog* : Alibanban ; *Tamil* : Kalavilaichi, Mandarai, Nilattiruvatti, Periavatti, Segappumandarai ; *Telugu* : Bodanta, Devakanjanamu, Kanjanamu, Peddare ; *Tharu* : Koilara : *Uriya* : Boroda, Debokanjoro, Kosonaro, Sono.

The Silk Cotton Tree (*Bombax malabaricum*) in flower.

Photographs by C. McCann.

Flowers of the Silk Cotton Tree (*Bombax malabaricum*).

SILK COTTON TREE
Bombax malabaricum, DC.
(1/2 nat. size)

TREE.

MALABARICUM DC.

—A tall deciduous tree with wide spreading branches n whorls. The stem is usually undivided and is generally supported at the base with large buttresses. The colour of the bark is grey ; it is covered with sharp, conical prickles which disappear with increasing age. The leaf is large and [illegible] of from 3 to 7 long, lance-shaped, [illegible] arranged like the fingers of a hand on a [illegible] illustrates the shape and arrangement of the leaves.

[illegible] are large and numerous. They grow in clusters on [illegible], towards the ends of the branches and appear before the new leaves. Occasionally the flowers are yellowish or white.

Calyx [illegible] cup-shaped, smooth outside, bright silky hairy within. The petals are hairy on the outside, slightly hairy within. They are [illegible], bent back and marked with close parallel veins. The petals may be from 3 to 6 in. long. The stamens, of which there are more than 60, are pink, flattened, slightly hairy, rather more than half as long as the petals. They are united only at the base to form 5 separate bundles containing from 9 to 12 stamens each. There is in addition, an inner bundle of 15 stamens of which

THE SILK COTTON TREE.

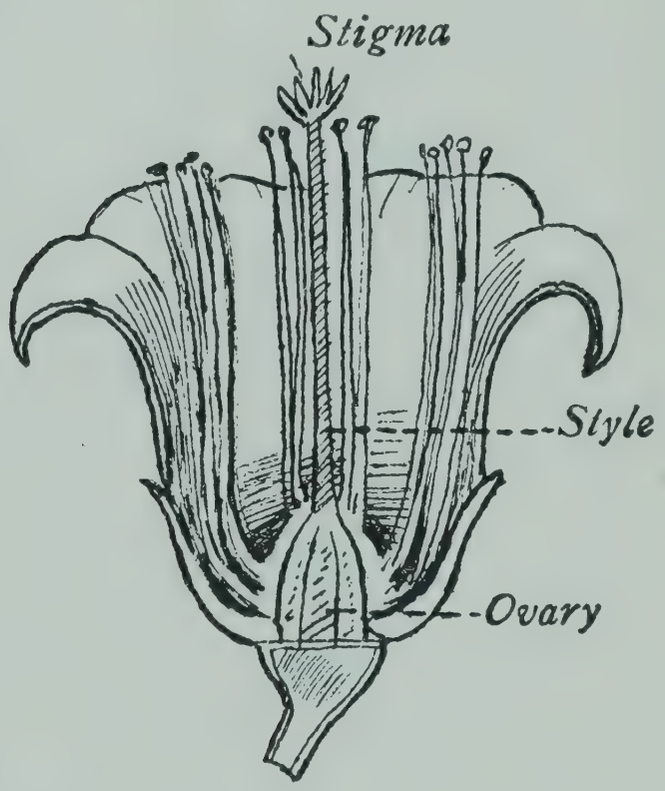
BOMBAX MALABARICUM DC.

Description.—A tall deciduous tree with wide spreading branches arranged in whorls. The stem is usually undivided and is generally supported at the base with large buttresses. The colour of the bark is grey ; it is covered with sharp, conical prickles which disappear with increasing age. The leaf is large and hairless. It is composed of from 3 to 7 long, lance-shaped, more or less leathery leaflets, arranged like the fingers of a hand on a long common stalk. The diagram illustrates the shape and arrangement of the leaflets. The

crimson flowers are large and numerous. They grow in clusters on short, thick stalks, towards the ends of the branches and appear before the new leaves. Occasionally the flowers are yellowish or white.

Calyx thick, fleshy cup-shaped, smooth outside, bright silky hairy within. The petals are hairy on the outside, slightly hairy within. They are fleshy, bent back and marked with close parallel veins. The petals may be from 3 to 6 in. long. The stamens, of which there are more than 60, are pink, flattened, slightly hairy, rather more than half as long as the petals. They are united only at the base to form 5 separate bundles containing from 9 to 12 stamens each. There is in addition, an inner bundle of 15 stamens of which

the 5 innermost are the longest ; the anthers are long and brown. The accompanying drawing of a longitudinal section of the flower illustrates its general shape and the arrangement of the inner organs. The ovary is conical in shape. It contains 5 cells, each holding many ovules. The ovary tapers at the apex to form a club-shaped



style which exceeds the stamens in length and ends in 5 slender projections—the stigmas.

The fruit attains a length of 4 to 5 in. It is oblong-egg-shaped, downy without and lined within with white silky hairs. It contains many dark brown seeds packed in white cotton.

Leaf-shedding.—In dry localities the trees start shedding their leaves at the beginning of December and are leafless by the end of that month. In moist localities the trees may keep their leaves till March. The new leaves make their appearance in March and April.

Flowers.—The large dark brown buds become visible in the month of December and the flowers come out in January and February, and sometimes continue till March. At the time of flowering the trees are usually leafless, but when flowers and leaves appear at the same time, the flowers are usually, less numerous.

"The trees when in full flower present a striking blaze of colour; the fleshy petals are attacked by crows, mynahs, and other birds, and when they fall to the ground they are eagerly devoured by deer. I have observed squirrels (*Sciurus maximus*) eating the flower-buds in quantities. Pollination is affected by bees, which visit the flowers in large numbers, as well as by birds, which seek the nectar or search for insects, and get their heads covered with pollen. Even martens (*Martes flavigula*) have been observed visiting the flowers in search of nectar" (Troup).

Fruits.—They ripen in April and May. Usually they open whilst still on the tree, but sometimes after falling. As the seeds are packed in masses of silky hairs they are easily blown about by the wind.

Distribution.—Indigenous throughout India and Burma, except in the most arid tracks. In the sub-Himalayan tract it extends from the Indus eastwards, ascending to 3,500 ft. in the N.W. Himalaya, and is cultivated as high as 6,000 ft., very common throughout the Bombay Presidency, in the Satpuras in exposed situations on hard trap-rock at 3,700 ft., in all forest districts of the Madras Presidency. Also in Ceylon, Yunnan, Cochin China, Tonkin, Siam, Java, Sumatra, Queensland and North Australia.

Economic value.—The tree yields a brown astringent, gum-like substance, known as *mocharas* and frequently seen in Indian bazaars.

The inner bark of the tree yields a good fibre suitable for cordage. Boatmen in Indo-China use the gummy fresh bark to stop holes in their craft.

The seeds yield cotton, a fibre too short and too soft to be spun.

The wood is whitish, coarse-grained, weak and brittle and subject to the attacks of white ants. A cubic foot weighs 28 lb.; it improves and is rendered more durable by moisture. In the Bombay Presidency the planks are extensively used in making the light packing boxes needed in the export of bulky goods from Bombay and other places, also for fishermen's floats; in Burma it is used for coffins, planks, doors and boxes; in the Punjab it is a favourite for well-curbs, water conduits, troughs and bridges; in Kangra and Yusufzai it is made into scabbards.

Domestic uses.—The calyx of the flower is eaten as a vegetable.

The leaves and twigs are lopped for fodder.

The silky floss which clothes the seeds is made into tinder, and is largely used for stuffing cushions and pillows.

Medicinal properties and uses.—Practically every part of the plant is used by Ayurveda practitioners ; but only the gum is recognized by Yunani doctors.

Caius and Mhaskar have shown experimentally that, contrary to the accepted opinion, neither the flower nor the fruit has any antidotal value against snake or scorpion venoms.

Popular beliefs.—In the Mahabharata it is related that Pitamaha after having created the world, reposed under the tree Salmuli.

The great thorns, thick at the base, prevent the monkey population from climbing the tree and sucking the sweet, stringy pulp from the swelling seed-pod.

Popular names.—The tree is called in Sanskrit "Yamadruma," tree of the infernal regions, because it makes a great show of flowers, but produces no fruit fit to eat.

Basim : Khatsawar ; *Bengal* : Roktosimul, Simul ; *Bhil* : Katseori ; *Bombay* : Katsevari, Saer, Saur, Semul, Shembal, Somr ; *Burma* : Didu, La-i, Lepanbin, Letpan ; *Cambodia* : Roka ; *Canarese* : Apurani, Buraga, Burga, Burla, Dudi, Elava, Hatti, Kempuburaga, Kempuburga, Mullelava, Mulluburaga, Pishphele, Sauri ; *Central Provinces* : Semar, Semur ; *Ceylon* : Parutti ; *Chinese* : Mu Mien ; *Deccan* : Kantonkakhatyan, Kantonkasemul, Lalkhatyan ; *English* : Cotton Tree, Red Cotton Tree, Red Silk-cotton Tree, Silk-cotton Tree ; *Formosa* : Moc-main, Pun-chi ; *French* : Bombax de Malabar, Cotonnier Mapou, Kapokier du Tonkin ; *Garhwal* : Shimal ; *Garo* : Bolchu, Panchu ; *Gond* : Vallaiki ; *Gujerat* : Ratoshemalo, Sauvor, Sawar, Shemalo, Shimar, Shimlo, Shimul ; *Hazara* : Simbal ; *Hindi* : Kantisembal, Pagun, Ragatsemal, Ragatsembal, Raktasemul, Semal, Semul, Semur, Shimbal, Simal, Som ; *Indo China* : Gao, Sich moc mien thu ; *Khond* ; Kamba ; *Kolami* ; Del, Edel, Idel ; *Konkani* ; Sanvor, Sauvor ; *Kumaon* : Shimlo ; *Lambadi* : Chamblero ; *Lepcha* : Sunglu, Tung-glu ; *Magahi* : Lapaing ; *Malaya* : Mooh min. Simur ; *Malayalam* : Ilavu, Mocha, Mullilavu, Pichila, Pula, Purani, Unnamuriku ; *Mal Paharia* : Simur ; *Marathi* : Kantasair, Kanterisamar, Kantesavar, Khatsawar, Sair, Sairi, Samar, Savara, Savari, Sayar, Semal, Shevari, Simlo, Tamari ; *Matheran* : Sarvar, Tambdisarvar ; *Melghat* ; Saori ; *Mundari* : Edelsanga ; *Palkonda* : Wuraga ; *Persian* : Sombal ; *Portuguese* ; Algodoeiro do matto, Arvore de panha, Panheira sumauma ; *Punjab* : Sum ; *Sanskrit* : Apurani, Kantadruma, Mocha, Shalmali, Yamadruma ; *Santali* : Edel : *Saora* : Buroh ; *Sinhalese* : Kattuimbul ; *Sutlej* : Shirlan ; *Tagalog* : Bobuygubat, Buboygubat, Malabulac ; *Tamil* : Agigi, Ilavam, Ilavu, Kongu, Mullilavu, Parutti, Pongar, Pulai, Purani, Sallagi, Samani, Sanmali, Selavagu, Sittan, Surabu ; *Telugu* : Buraga, Kondaburaga, Mundlaburaga, Pinnaburaga, Salmali ; *Tulu* : Ala, Mullala; *Uriya* : Buro, Mochoroso, Salmali, Simuli ; *Visayan* : Quesero, Salay, Talutu.

A. Bombax Linn.

(From the Greek *bombux*, signifying raw silk.)

The genus *Bombax* belongs to the family *Bombacaceae*, formerly included under the *Malvaceae*. It comprises about 60 species, indigenous chiefly in Central and South America. A few are found in the Tropics of the Old World.

They are deciduous trees with digitate leaves. The flowers arise from the axils of the leaves and are gathered at the end of branchlets. The calyx is leathery, cup-shaped and splitting irregularly. The petals are 5. The stamens are many, inserted at the base of the calyx, united into 5 bundles opposite to the petals. The fruit is 5-celled ; the cells are thickly clothed inside with long silky hairs, in which the seeds are embedded in dense wool.

KEY.

I.	Stamens 60 to 70	*B. malabaricum.*
II.	Stamens about 400 to 600	
	1. Flowers scarlet or white	*B. insigne.*
	2. Flowers salmon-pink	*B. scopulorum.*
III.	Stamens about 350	*B. anceps.*

Bombax insigne Wall.

A very large tree, with more or less prickly bark. Leaves hairless, long-stalked ; stalks as long or longer than the leaflets ; leaflets 5 to 9 or more, 5 to 6 in. long, inversely egg-shaped, narrowed at the base ; stalks of leaflets $\frac{1}{5}$ to $\frac{1}{3}$ in. long. The foliage of this species is difficult to distinguish from that of *B. malabaricum*. Flowers larger than in the previous species, solitary, on a thick, club-shaped, prickly stalk which is jointed at the top. Calyx $1\frac{1}{2}$ in. long, irregularly splitting at the top and finally deeply 2-cleft, sometimes prickly at the base outside, densely silky-hairy within. Corolla snowy, scarlet or white ; petals long, strap-shaped, 5 in. by $1\frac{1}{2}$ in., narrowed at the base, densely tomentose on both surfaces. Stamens 400 to 600, arranged in bundles, but not so distinctly as in *B. malabaricum* ; filaments filiform, 3 in. long, forked at the tip. Ovary egg-shaped, red-hairy. Style longer than the stamens ; stigma 5-lobed. Fruit a capsule, long, sausage-shaped, woody, 7 to 10 in. long, obscurely 5-angular, hairless.

Flowers and *fruits* at the same time as *B. malabaricum*.

Distribution —Burma, Pegu, Andamans, common on the Ghats of the Western Peninsula from the Konkan southwards gregarious in Northern Kanara from the coast upwards to the crest of the Ghats, also in the Konkan and Deccan districts, Anamalai Hills.

Uses.—The wood is more durable than that of the ordinary silk-cotton tree. The cubic foot weighs 31 lb.

The tree yields a brown gum.

Popular names.—Burma : Didu ; *Malayalam* : Kallilavu, Kattupula, Paryailavu ; *Tamil* : Kattilavu, Paraiyilavu ; *Bengal* : Semultula ; *Magahi* : Saitu.

Bombax scopulorum Dunn.

A small tree, having the appearance of the ordinary cotton tree, but never attaining its size, about 40 ft. high, 1 ft. diameter ; stem covered with prickles in clusters of 1 to 12, about $\frac{3}{4}$ in long. Leaves of 6 to 8 stalkless leaflets, 5 to 9 by 1 to 2 in., lance-shaped, dark green and hairless above. Flowers salmon-pink, 4 in. across, 7 in. long, solitary, appearing before the leaves. Stamens about 600, slender, white. Style simple. Fruit 7 to 10 in. long, velvety-brown. Seeds black, smooth, $\frac{1}{4}$ in. diameter, packed in white cotton.

Flowers in December to January.

Fruits January to February.

Distribution.—Travancore Hill, on rocks.

Popular names.—Malayalam : Kallilavu, Paryailavu ; *Tamil* : Kattilavu, Paryayilavu.

Bombax anceps Piere.

A lofty tree, reaching a height of 100 ft. and a girth of about 16 ft. Bark greyish, more or less prickly when young. Leaflets 5 to 7. Petals red or white, 3 in. long, slightly hairy on both faces. Stamens about 350, tube formed by the stamens $\frac{1}{4}$ in. long. Style hairless. Fruit a capsule, woody, dark-brown, $3\frac{1}{4}$ to 4 in. long with 5 very prominent rounded ridges.

Distribution.—Burma (Pegu and Arakan Yoma, Upper Burma, North Shan States, Salween), Cochin China.

Popular names.—Burma : Didok, Didu-pya ; *Karen* : Kowa ; *Pegu* : Didu letpan, Kokye.

B. Bombacaceae.

They are all arborescent, and principally tropical ; and they include some of the largest trees in the Vegetable Kingdom. One of the most striking is the African Baobab, *Adansonia digitata* Linn., grown in many parts of India ; it is remarkable for the excessive thickness of its trunk as compared with its height.

Photo by C. McCann.

The Flame of the Forest (*Butea frondosa*).
A flowering branch.

Photo by C. McCann.

The Flame of the Forest (*Butea frondosa*).
General appearance.

FLAME OF THE FOREST.

Butea frondosa. Koeng

(½ nat. size)

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THE FLAME OF THE FOREST.

BUTEA FRONDOSA König.

The genus is named after John Stuart (1713-92), 3rd Earl of Bute, munificent patron of Botany. *Frondosa* is Latin for "leafy."

This is the tree we consider the true "Flame of the Forest." In parts of the country where these trees abound, such as the forests of the Western Ghats and Central India, their massed crowns of bright orange flowers, seen in the glitter of the sunlight suggest the semblance to a forest in flames. So brilliant, so vivid is their colouring!

Description.—An erect tree growing from 20 to 40 ft. in height, with a crooked trunk and irregular branches. Its bark is ash-colour and rough, though the younger portions of the tree are downy. The leaf is trifoliate. It is composed or made up of three leaflets, leathery

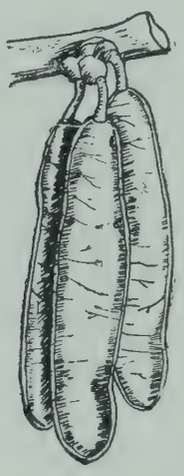
in texture. The old leaves are hairless above and finely silky below; this silky covering gives the leaves a peculiar greyish appearance when seen from a distance. The network of veins stands out very conspicuously beneath the leaf. The terminal leaflet is a blunt oval in shape. It is described as obovate, or rounded at the apex and narrowing to a wedge at its base. It measures from 4 to 8 in. in length and is about as broad as long. The lateral leaflets are broader at the base and more rounded. They measure from 4 to 6 by 3 to 4 in. The main stalk of the leaf is quite 4 to 6 in. in length, those of the leaflets are about a quarter of an inch.

Grouped in threes along a velvety, dark olive-green stalk, the handsome flowers grow in great profusion in stiff racemes, about 6 in. long. The individual stalks of the flowers are about twice as long as the calyx, which is deep velvety, olive-green externally and clothed with silken hairs within. The rich dark tones of the stalks

Date

and the calices present a striking contrast to the flaming orange colouring of the petals. The outer or under surfaces of the petals take on a salmon-pink tone due to a delicate covering of silvery hairs. Five petals are apparent. A standard petal, about an inch broad, two smaller wing petals and a much curved, beak-shaped keel which is really formed by the fusion of two petals. The stamens are practically enclosed within the keel. There are 10 of them, 9 united in a bunch and 1 free.

The pod when young is pale green. When ripe, it fades to a pale yellowish-brown or grey. It carries a silvery white sheen. It is extremely flat and thin except at the apex where a slight thickening indicates the position of its single seed. A thickening is also seen along the margins.



The leaves begin to fall at the end of November or during December. By the end of January some trees are leafless, or nearly so. Others retain their leaves, especially on the lower branches, during the flowering season, up to the end of March. New leaves appear in April or early May and are of a delicate fresh-green colour.

Flowering season.—The flower buds are blackish and appear on the bare branches in January, and from the end of that month to the end of March the trees announce the approach of the hot weather by bursting into a blaze of flaming orange flowers, presenting a gorgeous sight. When in flower, the tree is either entirely leafless or there are some leaves on the lower branches. The flowers cover chiefly the upper part of the tree. Flowering continues, according to locality, up to the end of April. The time of flowering is greatly influenced by seasonal conditions. In dry seasons the flowers appear earlier than usual.

The pale-green flat pods develop very quickly and in April the leafless trees, covered with green pods, give the impression of being in full foliage.

Varieties.—In Volume vi, page 107, of the *Journal of the Bombay Natural History Society*, Mr. H. T. Ommanney of the Bombay Civil Service, records a variety of *Butea frondosa* which he observed at Ghodra in the Panch Mahals. Instead of the customary dazzling blaze of orange, the flowers were a pale yellow. The bases of the

petals were primrose-yellow shading to a creamy tint on the edges and on the reverse sides. Col. C. E. Luard describes a variety seen by him in Manpur Pargana, Central Indian Agency, which produced golden-yellow flowers. He described their colouring as similar to that of the sunflower (*Journal of the Bombay Natural History Society*, Vol. xxvi, page 305). A yellow variety is also known from Amraoti, Berars. Seeds of this variety, sent by Major D. O. Morris to Mr. W. S. Millard in Bombay, were planted ; one tree is now growing in the Ladies' Gymkhana, Malabar Hill, Bombay.

Distribution.—Common throughout the greater part of India and Burma. In the outer Himalaya it ascends to about 3,000 ft., in Southern India to 4,000 ft. In the most arid regions it is rare or absent. In open grass lands the tree is very typical and is often found gregarious.

Gardening.—The long pod has only one seed near the top. On germination the seed remains in the pod which opens at the tip and allows the young shoot and root to emerge. The cotyledons remain attached to the seedling for a considerable time. Growth is greatly stimulated by weeding and irrigation, and Troup is of opinion that the former is even more important than the latter. The thick, long tap-root is often devoured by pigs, rats and porcupines. The roots have a wonderful power of recovery and any part not destroyed by animals will send up new shoots.

Propagated by seeds. Thrives in black-cotton soil, also in salt lands and in water-logged places.

Economic value.—The brilliant orange flowers which appear before the leaves make the plant a very attractive one for decorative purposes.

A valuable tree for recovering salt lands, and next to *Schleichera trijuga* the most important one for the development of the lac insect.

A ruby coloured gum exudes from the tree either naturally or from artificial scars. It is largely used in medicine as also in tanning and dyeing.

The young roots yield a fibre which is made into ropes and native sandals. The inner bark also yields a strong fibre which is used for rough cordage, for caulking boats and for paper-making.

The leaves serve as plates, and are also used for making umbrellas. They are used as manure.

A clear bright oil is extracted from the seeds in small quantities.

An infusion of the flowers dyes cotton, previously prepared with alum, a bright yellow, which may be changed by an alkali into deep orange.

The wood generally resembles teak in appearance. In Gujerat and in the Central Province of Ceylon it is extensively employed for house-building purposes. In the Punjab it is used for well-curbs, piles, and water scoops of native wells ; it is also used for gunpowder charcoal. Well seasoned, it weighs from 30 to 40 lb. per cubic foot.

Domestic uses.—The root of young trees, 1 to 2 years old, is baked and eaten by Mundari children ; when eaten raw, it causes giddiness.

The leaves are given as fodder to buffaloes and elephants.

Medicinal properties and uses.—The gum is used as an external astringent.

The bark and the seed are given for snake-bite, and the ash of a young branch is prescribed in combination with other drugs in cases of scorpion-sting, but, as shown experimentally by Caius and Mhaskar, they are all equally useless.

Popular beliefs.—The tree is sacred to the Moon, and is said to have sprung from the feather of a falcon imbued with the Soma, the beverage of the gods. It is supposed to be thus imbued with the immortalizing Soma. It is much employed in the Hindu ceremonies connected with the blessing of calves to ensure them providing good milkers.

The dry twigs are used to feed the sacred fire. The wood is sacrificial, and is frequently mentioned in the Vedas ; from it are made sacred utensils and the staff of the Brahmin which is placed in his hand as part of the thread ceremony.

When, the last tuft of hair being removed, a Brahmin boy becomes a Sadhu, he must eat from a "palas" leaf. This is trifoliate ; the middle leaflet is supposed to represent Vishnu, the left Brahma and the right Shiva.

The red flowers are offered to the gods, and in the spring festivals they serve to give a temporary yellow-dye to the clothes of their votaries. They are likened by the Buddhists to penitents dressed in red ; and Amir Khusru, the Turkoman poet, likened them to a lion's claws stained with blood.

Popular names.—Annam : Cay gieng gieng ; *Baigas* : Pharsa ; *Bandelkhand* : Chalcha ; *Bengal* : Kinaka, Palas, Palasa, Paras ; *Berar* : Palas ; *Betul* : Palas ; *Bihar* : Faras, Paras ; *Bombay* : Khakara, Khakharo, Palasa ; *Burma* : Pauk, Pouk, Pouk-pin ; *Canarese* : Brahmavikraha, Muttaga, Muttala, Muttuga, Palasa ; *Central Provinces* : Chinta, Chiula, Purohapalas ; *Cutch* : Khakar, Palas ; *Deccan* : Palas, Pullas, Tesu ; *English* : Bastard Teak, Flame of the Forest ; *French* : Butée feuillue, Butée touffue, Erythrine monosperme ; *Gond* : Murr ; *Gujerati* : Kakria, Khakara, Khakda, Khakhado, Khakhar, Khakharo, Palasso ; *Hindi* : Chalcha, Chichra, Desukajhad, Dhak, Kakria, Kankrei, Palasa, Parasa, Pursha, Tesu ; *Indo-China* : Chea tran, Chiang, Gieng gieng, Tu khoang ; *Kadir* : Mukkappuyam ; *Kolami* : Morud, Murut ; *Kumaon* : Dhak ; *Kurku* : Murr, Pharsa ; *Lambadi* : Dagodar ; *Lepcha* : Lahokung ; *Malayalam* : Brahmavriksham, Kimshukam, Mukkappuyam, Muriku, Palasi, Palasinjamata, Plaso, Puppalasi, Shamata ; *Marathi* : Kakracha, Palas, Paras, Phalas, Phulas ; *Matheran* : Khakra, Pulas ; *Mechi* : Palashu ; *Mundari* : Muruddaru ; *Nepal* : Bulyettra, Palasi ; *Nimar* : Palas ; *Persian* : Darakhte-palah, Palah ; *Portuguese* : Favas de engenho ; *Punjab* : Chachra, Pla, Sanura ; *Sanskrit* : Bijasneha, Bramhopadapa, Karaka, Krimighna, Lakshataru, Palasha, Raktapushpaka, Tripatraka ; *Santali* : Murup ; *Sinhalese* : Gaskeala, Kaliya, Kalukeale ; *Tamil* : Kattumurukku, Murukku, Palasu, Parasu, Pungu, Purasu, Vallai, Vallaippurasu ; *Telugu* : Kimsukamu, Modugu, Palasamu, Tellamoduga, Togarumoduga, Vatapodhamu ; *Tulu* : Palasa ; *Urdu* : Palashpapra ; *Uriya* : Kinjuko, Polas, Polaso, Porasu.

Butea Koenig.

Four or five species of trees or woody vines of India and China, with deep scarlet papilionaceous flowers in racemes, and pinnate leaves.

THE CLIMBING PALAS.

Butea superba Roxb.

A gigantic woody climber with a stem as thick as a man's leg, with very large long pointed leaflets. The leaflets are much larger than those of *B. frondosa*, usually 12 to 18 in. in length, attaining quite 20 in. in young plants. The climber is crowded, when leafless, with gorgeous orange scarlet flowers. The flowers again are much larger than those of *B. frondosa* and are borne on stalks three times the length of the calyx.

Flowers.—The climber flowers between March and April. The pods ripen in June and July, and the leaves are shed between February and May. The pods are like those of *B. frondosa*.

Distribution.—Central and Southern India, Burma.

Uses.—The roots and also the young branches afford a strong and useful fibre.

The leaves are regarded as a valuable fodder.

The tree yields a gum.

The root, the bark, the flowers are all prescribed for the treatment of snake-bite ; the flowers are recommended for scorpion-sting ; but no part of the plant is an antidote to either snake or scorpion venom (Caius and Mhaskar).

Popular names.—Bengal : Latapalash ; *Berar* : Belia palas, Palasvel ; *Bombay* : Palasavela, Palasi ; *Burma* : Poukgnwe ; *Cambodia* : Char ; *Canarese* : Muttuginaballi ; *Deccan* : Bel palas ; *English* : Climbing palas ; *Gond* : Samur ; *Gujerati* : Velkhakar ; *Kharwar* : Dorang ; *Kolami* : Morud ; *Koya* : Modugaige ; *Kurku* : Tunang ; *Lao* : Mai kwou krena ; *Murathi* : Beltivas, Palasavela, Palasvel, Yelparas ; *Monghyr* : Chihunt ; *Mundari* : Laramurud, Narimurud ; *Sanskrit* : Latapalasha ; *Santali* : Narimurup ; *Singrampur* : Baduri ; *Telugu* : Modugaige, Tigamaduga, Tigemoduga, Tivvamoduga ; *Uriya* : Noipalas, Noipolaso, Palsanoi, Polasonoi.

THE INDIAN LABURNUM.

CASSIA FISTULA Linn.

Cassia is the old Greek name of Dioscorides. *Fistula* means a pipe alluding to the tubular shape of the fruit.

Description.—This beautiful tree is frequently planted on city roads and avenues. Laburnum Road in Bombay derives its name from the number of Indian Laburnums planted there.

It is a more gracefully shaped tree than the English Laburnum. The Indian Laburnum is a small, upright tree which grows to a height of 20 or 30 ft. Its trunk is short, its branches slender,

THE INDIAN LABURNUM.
Cassia fistula, Linn.
(½ nat. size)

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Photo by W. S. La Personne.

The Indian Laburnum (*Cassia fistula*).

Photo by C. McCann.

Flowering Branch of the Indian Laburnum (*Cassia fistula*).

upright and spreading ; its foliage of the deepest green. In young trees the bark is smooth and ash-coloured. In older trees it becomes rough and dark brown. The tree has a compound leaf. The pubescent or slightly downy mainstalk or rachis of the leaf, 9 to 16 in. long, bears from 4 to 8 pairs of leaflets. Those growing about the base of the rachis are broadly ovate in shape, while the leaflets nearer its tip are more oblong and blunt ended. The leaflets grow opposite or nearly opposite one another. They are from 2 to 5 in. long and about $1\frac{1}{2}$ to $3\frac{3}{4}$ in. broad. They are smooth above and covered with fine veins, more conspicuous on the under surface of the leaflet. The tender leaves are bright green and covered below with a silvery down. The erect branches and large leaves are distinctive in the Indian Laburnum and quite unlike the feathery, mimosa-like foliage and drooping branches so usual among the Cassia trees.

Few trees in India are more beautiful when in flower. Draped in streaming clusters of bright yellow blossoms, which hang from its branches in a golden shower, the tree suggests the English Laburnum, but it is infinitely more beautiful. Its drooping clusters of flowers are longer and the flowers themselves much larger. Each raceme or cluster is from 12 to 18 in. long. The cluster is made up of slender, thread-like stalks which hang downwards and bear a profusion of large, fragrant, yellow flowers. The stalk of a flower is from $1\frac{1}{2}$ to $2\frac{1}{4}$ in. long. It is slender, slightly hairy or quite smooth. The calyx is made of 5 tender green sepals which fold backwards on the stalk. There are 5 petals almost equal in size, almost oval in shape and very distinctly veined. They enclose 10 thread-like stamens all crowned with anthers. The 3 longest stamens are much curled and bear large, oblong anthers. There are 4 smaller median

ones which are quite straight, the 3 remaining stamens are quite short and erect. Their anthers do not bear pollen. The pods of which there is always a great profusion are very conspicuous during leaf fall. They hang like so many straight pipes and have given the tree its Latin name of *Fistula*. For a similar reason the Dutch, an unromantic people, called our Laburnum the Pudding-Pipe Tree, while the Bengalee refers to the pods as " Monkey Sticks." The pod is a straight cylinder. It is from a foot to 3 ft. in length, and about an inch in thickness. It is quite smooth and dark green when young, turning dark brown and then black with age. Each pod contains from 40 to a 100 oval, shining, yellowish-brown seeds embedded in a dark coloured, sweetish pulp.

Distribution.—Common in deciduous forests throughout the greater part of India and Burma, ascending to 4,000 ft. in the Himalaya ; also in Ceylon. The tree is not gregarious, but is scattered in mixed deciduous forests, often of a somewhat open type : it occurs fairly frequently in sal forest. Sometimes it approaches gregariousness in localities frequented by monkeys. It is found on a variety of geological formations and will grow on poor shallow soil, as on the dry outer slopes of the Himalaya. In climatic requirements it shows a wide range. In its natural habit at the absolute maximum shade temperature varies from 100° to 120° F., the absolute minimum from 25° to 65° F., and the normal rainfall from 20 to 120 in. or more.

Leaf-shedding, flowering and fruiting.—The tree is leafless for a very short time, or hardly at all, between March and May, the new leaves appearing in April to May ; these are bright green or sometimes a beautiful rich copper colour. The long pendulous racemes of large bright yellow flowers appear chiefly with the new leaves from April to June, but it is no uncommon thing to find the tree in flower even as late as September, particularly in dry years. The long cylindrical pods develop rapidly, reaching almost full length but not full thickness by October, when they are still soft and green. By November they are full-sized but still green and unripe ; they commence ripening in December and continue ripening from January till March or April. The ripe pods hang for some time on the tree, commencing to fall about April to May, continuing to fall in the following months ; old pods may often be found on the trees in September or later along with the new half-grown green pods.

Like many other hard leguminous seeds, those of *Cassia Fistula* take some time to germinate, some lying a whole year in the ground before doing so, even if regularly watered. Boiling the seeds for about five minutes before sowing, has been found to give very good results in stimulating germination. Tests carried out at Dehra Dun showed that the seeds retain their vitality unimpaired for at least 2 years. It was found that seeds from pods one year old germinated more quickly than those from fresh pods, though the percentage of sound seeds in the former may be low owing to insect attacks (ex Troup).

Gardening.—*C. Fistula* stands a moderate amount of shade. It is not frost-hardy, and suffered severely in the great frost of 1905

in Northern India. In the abnormal drought of 1907 and 1908, which seriously affected the forests of Oudh, it proved to be decidedly hardy. It is not readily browsed, even by goats. It coppices vigorously and produces root-suckers from a root-system which is partly superficial. As already stated, it is not exacting as regards soil, and may be found on poor shallow soils.

Natural reproduction.—The following facts have been established regarding the natural reproduction of this tree from seed :—

(1) Reproduction is effected mainly, and perhaps entirely, through the agency of animals (monkeys, jackals, bears, pigs, and possibly others), which break open the pods to eat the pulp and thus scatter the seeds or swallow and disseminate them.

(2) The seed germinates during the rainy season, some lying dormant until the second or even the third rains.

(3) Germination is favoured if the seed becomes buried, and to some extent if it is protected by a moderate growth of grass ; if the seed lies on the surface of the ground, much mortality takes place during germination owing to the destruction of the radicle by birds and insects, or to its drying up if exposed to the sun.

(4) Many seedlings perish in heavy weed-growth owing to damping off during the rains.

Artificial reproduction.—The seed germinates tardily, that kept for a year germinating more readily than fresh seed. The seed should be sown in seed-beds in drills about 10 in. apart in March or April, and regularly watered ; germination ordinarily takes place early in the rains, though some of the seed may lie dormant until the second year, germinating at different times from March onwards. Transplanting requires some care, but it can be carried out satisfactorily while the plants are still comparatively small during the first rains ; basket-planting is the most satisfactory method, the seedlings being transferred to the baskets in the first rains and planted out in the second rains (Troup).

Economic value.—The tree is very suitable for decorative purposes

From the stem exudes a red juice which hardens into a gummy substance.

The bark is used to some extent as a tanning material in India, and for dyeing and tanning in Java.

The pulp of the pods is largely used in Bengal to flavour native tobacco.

The wood ash is used as a mordant in dyeing.

The wood is very durable ; used for tom-toms, bows, posts, agricultural implements, carts, and rice pounders, though rarely of sufficiently large size for timber ; weighs 52 to 73 lb. per cubic foot. It has been recommended for paving blocks. Sapwood large, heartwood varying in colour from grey or yellowish-red to brick-red, extremely hard.

Domestic uses.—The flowers are largely used by the Santals as an article of food.

Medicinal properties and uses.—In Hindu medicine the pulp is used as a cathartic ; and the root is also described as a laxative, useful in fever, heart disease, retained excretions, biliousness, etc.

In the Makhzan-El-Adwiya, the pulp is described as lenitive, useful for relieving thoracic obstructions and heat of blood, and is a safe aperient for children and women. Externally, it is said to be a good application for gout, rheumatism, etc. The flowers are made into a confection known as *Gul-kand* and viewed as a febrifuge. From 5 to 7 of the powdered seeds are prescribed as an emetic, and the shell of the pod rubbed down with saffron, sugar and rose-water, in difficult parturition. In the Konkan, the juice of the young leaves is used to cure ringworm and allay the irritation caused by the application of the marking-nut juice.

The root is given as a tonic and febrifuge. It has been found to act as a strong purgative.

A poultice made of the leaves is said to relieve the chilblains which are common in Upper Sind. It has been beneficially used in facial paralysis and rheumatism when rubbed into the affected parts. Internally, it is given as a derivative in paralysis and brain affections.

The pulp of the fruit is in common use as a purgative in the South of Europe ; but is not often employed in England, except in the form of the *Lenitive Electuary* of which it is an ingredient.

No part of the plant is an antidote to either snake or scorpion venom (Caius and Mhaskar).

By steam-distilling the finely powdered fruit of *Cassia Fistula*, a dark yellow volatile oil, possessing a honey-like odour, is obtained. The oil forms an amorphous mass at ordinary temperatures, melts at 41° C., and has a faint acid reaction. The water which distils over with the oil, contains normal butyric acid.

Popular beliefs.—In Mysore stakes from the tree are fixed in the ground and worshipped.

Popular names.—Arabic : Bukbur, Chiar-schambar, Katha-ul-hind, Khiyar shambur ; *Assam* : Sonaru, Sunaru ; *Baigas* : Raella ; *Bengal* : Amultas, Bandarlati, Sonali, Sondala, Sondali, Sudali, Suvarnaka ; *Berar* : Bahala, Bahawa ; *Betul* : Amaltas ; *Bijnor* : Kitwali ; *Burma* : Gnookye, Gnooshway, Ngu ; *Cachar* : Bandolat ; *Cambodia* : Reach chhpus ; *Canarese* : Aragina, Aragvadha, Arevata, Kaki, Kakkai, Kakke, Konde, Rajataru ; *Central Provinces* : Hirojah, Jaggarwah, Karkacha, Raila ; *Chinese* : A Po Le, Koui Hoa Ts'in, Tch'ang Ko Chou ; *Deccan* : Amaltas, Bawa, Bhaya, Girmalah ; *Dehra Dun* : Kirala ; *Egypt* : Chiar schambar ; *English* : Cassia, Drumstick, Golden Shower, Indian Laburnum, Pudding-pipe, Pudding-stick, Purging Cassia, Purging Fistula ; *French* : Canéfice, Canéficier, Canificier, Casse mondée, Casse officinale, Cassier ; *Garhwal* : Simara, Sinara ; *Garo* : Sonalu ; *German* : Fistelkassie, Kassienroehrlein, Purgirkassie, Rohrkassie, Wurstroehrenbaum ; *Gond* : Jaggra, Jugarua, Kambar, Rera ; *Greek* : Glykokalamon, Kassia melaina, Melaina kassia, Syrina ; *Guam* : Cañafistula ; *Gujerat* : Balla, Garmala, Garmalo, Girmala ; *Hawaii* : Golden Shower ; *Hindi* : Amaltas, Bandarlauri, Girmalah, Hamaltas, Khyar, Paikassi, Sundaraj, Thumfur ; *Indo-China* : Bo cap muoc, Brai xiem, Krete, Sach phle ; *Italian* : Cassia ; *Java* : Tanggoeli ; *Kharwar* : Danbar, Dhanrach, Dunras ; *Khond* : Pundali ; *Kolami* : Hari ; *Konkani* : Baio, Ballo, Bavo ; *Kotra* : Chuntur ; *Kumaon* : Amaltas, Kitola, Rajbriksh ; *Kurku* : Banag, Bangru, Bhanaka-bhungru ; *Lambadi* : Ramdanda ; *Lepcha* : Sung-gyen ; *Malaya* : Sonawir ; *Malayalam* : Konna, Kritamalam, Saturangulam, Svarnnakam, Svarnaviram ; *Marathi* : Bahava, Bawa, Bhawabaya, Boya, Chimkani, Garmala, Girimala ; *Matheran* : Bahawa, Garmala ; *Mexico* : Cañafistula, Cuauhnacaztli, Honxin ; *Mundari* : Haridaru ; *Nasirabad* : Chhamkani, Chimkani ; *Nepal* : Rajbirij, Rajbriksha ; *Nimar* : Amaltas ; *North-Western Provinces* : Itola, Kitoli, Kitwali, Shimarra, Sim ; *Oudh* : Warga ; *Palamow* :

Bonurlati, Bonurlauri ; *Persian* : Khiyarchanbar, Khiyar-e-chiga ; *Philippines* : Cañafistula, Cañapistola ; *Porebunder* : Garmalo ; *Portuguese* : Canna fistula, Cassia fistula ; *Punjab* : Alash, Ali, Amaltas, Kaniar, Karangal, Kiar ; *Reddi* : Rela ; *Sanskrit* : Aragvadha, Arogyashimbi, Chaturangula, Himapushpa, Kritamala, Maharaj druma, Rajataru, Svarnabhushana, Vyadivata ; *Santali* : Mirjubaha, Nuruc', Nuruic ; *Saora* : Rella, Sonnalu ; *Sind* : Chimkani ; *Sinhalese* : Ahalla, Ahilla, Ehela ; *Spanish* : Cañafistola, Caña fistula ; *Tagalog* : Ancherhan, Cañapistola, Quiñapestula ; *Tamil* : Appai, Aragoram, Irali, Iyagam, Kondrai, Madalai, Sarakkondrai ; *Telugu* : Aragvadhamu, Kolapouna, Rela, Sampakamu, Suvarnamu ; *Tulu* : Konde ; *Uran* : Sonarki ; *Urdu* : Amaltas ; *Uriya* : Sandari, Soturongulo, Sonari, Sunari ; *Visayan* : Balay, Balayong, Boloyong, Ibabao, Lombayong ; *Yemen* : Chiar schambar.

Cassia Linn.

Cassia is an ancient Greek name for a genus which comprises some 400 different trees, shrubs and herbs, some of them famed for the beauty and profusion of their flowers, others for their medicinal value. The genus is included in the family *Caesalpiniaceae* which is named after the Italian botanist Andreas Caesalpinus who flourished between 1519 and 1603. We propose to illustrate in colour 3 species of this genus which are noted for their showy flowers, and to refer more briefly to a few others, which are as commonly cultivated.

We append here a key which will help in distinguishing the various species of Cassias we have described.

A. Bracts very small falling off long before the flowers appear :

1. Leaflets few, large, smooth, in distant pairs... *C. Fistula.*
2. Leaflets many, hairy, in closely approximate pairs ... ... *C. grandis.*

B. Bracts conspicuous persisting till the flowers open.

a. Leaflets 6 to 14 pairs. Racemes lateral :

1. Leaflets pointed at the tips ; smooth ... *C. nodosa.*
2. Leaflets rounded at the tips, hairy below ... *C. javanica.*

b. Leaflets 8 to 20 pairs. Racemes growing from the scars of the fallen leaves ... ... *C. renigera.*

c. Leaflets 10 to 20 pairs. Racemes growing in the axils of the leaves on the young twigs of the year ... ... *C. marginata.*

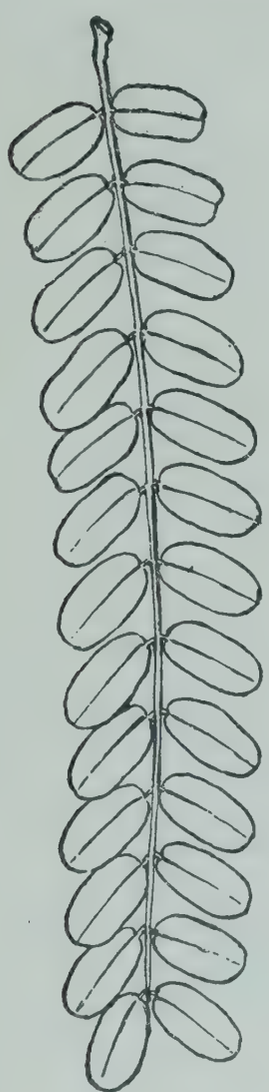
d. Leaflets 20 to 25 pairs ... ... *C. multijuga.*

The Cassias delight in a sunny exposure ; they are summer bloomers for the most part. Propagation is mostly by divisions and seeds, the annual species always by seeds.

THE JAVA CASSIA.

CASSIA JAVANICA Linn.

Description.—Roxburgh describes this Cassia as the most beautiful he has ever seen. It is a medium-sized tree. Its straight trunk, covered with smooth, dark brown bark, supports a spreading crown of sturdy horizontal branches and numerous, drooping feathery-leafed branchlets. The leaves are from 6 to 12 in. in length. At the



base of the leaf-stalk is a crescent-shaped stipule. Its lower half is narrow, the upper half is broader with a spur in a notch at its apex. A large leaf is composed of from 8 to 14 pairs of leaflets; on the smaller leaves growing on the lateral flower-bearing branchlets there may be no more than 2 to 4 pairs. These leaflets are 1 to 2 in.

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Cassia javanica, Linn
(about ½ nat. size)

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THE JAVA CASSIA
Cassia javanica, Linn.
(about ½ nat. size)

The Java Cassia (*Cassia javanica*) trees in flower at the Royal Bombay Yacht Club.

in length and about half that in breadth. They are all very short-stalked, oblong-oval in shape and rounded or blunt at the tips. There is much variation in the shape of the leaflets, mostly they are blunt at the apex but in some this character is less pronounced. In texture they are smooth and silky, the under surface being covered with a mat of downy hairs. They are quite glossless. Leaf fall commences in December, some of the leaves turn a bright yellow ; by February most of the branches are bare—their only ornament is the blackened seed pods. The soft tender green leaves come out in May together with clusters of deep pink buds. The buds are grouped in whorls at the end of short, lateral branchlets. These presently opening form lovely bunches of rose-pink flowers. In its crown of tender green flowers and flower-laden branches the Java Cassia is indescribably beautiful. The distinct clusters of flowers intermingled with the foliage is a character which distinguishes the flowering of this Cassia from the Burmese Pink Cassia (*C. renigera*). In the latter the flowering branches are leafless. Except for a few leaves at the extremity they are covered with a flow of pink and white blooms in which the individual clusters are not readily discernible. In *Cassia javanica* each cluster of flowers contains about 10 blooms growing on long, slender stalks. At the base of each stalk is a leafy, dull-red heart-shaped bract. The calyx has 5 deep red sepals. The oblong petals are of a lively rose-pink, veined in deeper pink. They fade to white. The red bracts and sepals, the deep pink buds, the pink and white of the petals give the clusters a lively, variegated appearance. There are 10 bright yellow stamens. The 3 lower stamens are long and prominent. They project in a double curve, swell out markedly in the middle and then bend inwards. They are crowned with large brown anthers. The anthers on the smaller stamens are yellow. All of them are fertile. The style is green.

The pods grow from 15 to 24 in. in length ; externally they differ in no way from those of the Indian Laburnum (*Cassia Fistula*). The only distinguishing feature is the soft sweet pulp of *C. Fistula*. In a pod of the Java Cassia the space between the partitions—there are 70 to 80 of them—is filled with a spongy mass in which there is a roomy cell for a flattened seed, the size of a pea, smooth and of a shiny brown colour.

Flowering season.—The tree flowers in May and by mid-June the height of the flowering season is past and the ground below the tree is strewn with fallen petals. The seed pods ripen about February. This is another of the beautiful trees which, during the hot weather, brighten the roadsides and gardens of Bombay, where it was introduced about the year 1910. Mr. H. V. Kemball was prominent in introducing it. Unfortunately the tree has not a long life.

Distribution.—A native of Sumatra and Java. Planted in the Peninsula, in Calcutta and Bombay, very likely elsewhere.

Uses.—In French Guiana it is used medicinally as a substitute for *C. Fistula*.

Popular names.—English : Java Cassia, Javanese Cassia ; *French Guiana* : Casse-para.

Cassia nodosa Ham.

The term *nodosa* means a node. It alludes to a character in the 3 longer stamens of the flowers of this tree which are spherically thickened in the middle. The character is present in the flowers of some other species of the genus.

As this Cassia, in common with the Java Cassia, is frequently planted on roadsides and in gardens, we give here a description which emphasizes the points of distinction between these two trees which are very similar in general habit.

Cassia nodosa grows to a larger size than the Java Cassia. Like the Java Cassia, it has a crown of spreading branches with numerous drooping feathery-leafed branchlets. The leaf is from 6 in. to a foot in length. It is composed of from 6 to 13 pairs of leaflets without an odd terminal leaflet. The base of the leaflet is oval but towards the apex it narrows and becomes almost lance-shaped. The leaflets of the Java Cassia are blunt or rounded at the tips. Another point of distinction is the texture of the leaflets. Those of the Java

Flowers and leaves of *Cassia javanica* Linn. Note the blunt tips of the leaflets.

Photos by C McCann.

Flowers and leaves of *Cassia nodosa* Ham. The leaflets are more oblong and pointed than in *Cassia javanica*.

Cassia are glossless, slightly downy below. They have a silky feel. The leaflets of *C. nodosa*, when full grown, are smooth and leathery in texture with a glossy upper surface. Like the Java Cassia, the flowers come out in big distinct clusters. These clusters, grouped along the branches in pairs or solitary, grow from the axils of the leaves or more usually above the scars of the fallen ones. The flowers and buds are of the same bright pink colour and display the same tendency to fade white. They are set in whorls at the end of a short branchlet. The points of distinction are : The flower of *C. nodosa* has a velvety calyx with green sepals, in *C. javanica* the calyx is smooth and the under surface of the sepals is deep red ; the petals of the former are more sharply pointed at the tips than in the Java Cassia ; finally the leafy bracts at the base of the flower stalks are distinctly heart-shaped in *C. javanica* while in *nodosa* they are narrow and lance-shaped. The flowers have 10 very unequal stamens. The lower 3 are the longest, each with a distinctive globular swelling in the middle. These nodes in the middle of the stamens give the tree its name, but this character is also present in the flowers of *C. javanica* and in other Cassias. The pods are similar in both trees. Those of the Java Cassia are said to grow longer, reaching from 18 to 24 in. while the pods of *C. nodosa* are from 12 to 18 in. in length.

Flowering season.—May and June.

Distribution.—Burma, Chittagong, Malay Peninsula, China, Sumatra, Borneo.

Popular names.—Burmese : Nguthein ; *Malay* : Busuk-busuk, Sibusuk, Turukop bumi.

The Red Cassia.

Cassia marginata Roxb.

Description.—A rather small, round-shaped tree, growing about from 15 to 20 ft. in height with slender, downward curving branches. Less robust in appearance than the Cassias previously described, the Red Cassia is uncommonly beautiful at all times, particularly when in full flower. The leaf is composed of from 10 to 20 pairs of leaflets. They are leathery, smooth above and blunt at the tips. The flowers appear in small single clusters growing from the axils of the leaves, on the young twigs of the year. There is a great profusion of them covering the upper surfaces of the drooping branches. The petals of the flowers are terra-cotta red with fine green veins, deeper in tone on the under surfaces. The older blooms are very bright pink. The 2 lower petals of the flower are usually the largest, though the flower itself is small, the petals not being more than half an inch in length. All the stamens bear anthers. The 3 uppermost are the longest, they protrude and curve inwards and are crowned with dark red anthers. They have no swelling in the middle as with the stamens of *C. nodosa* and some of the other species. In the centre there are 4 much smaller stamens with bright

red anthers and 2 lower stamens. These 2 are the smallest. They bear yellow anthers. The sepals are salmon pink. There are pale green bracts at the base of the flower stalks. The pods are cylindrical, 8 to 12 in. long with transverse partitions.

Flowering season.—The Red Cassia commences to flower in May, though the height of the flowering season is June when the trees are smothered with their little red flowers. The seed pods are ripe in March and April.

Distribution.—The Red Cassia is a native of Ceylon. It was introduced into the Royal Botanic Gardens at Calcutta in 1802. It is a common tree in South India from South Arcot to Travancore and

in the forests of Mysore and the Carnatic. It is not uncommon in Bombay gardens. There are a number of fine specimens in the grounds of St. George's Hospital, originally planted by the late Lt.-Col. H. P. Dimmock, I.M.S.

Economic value.—Heart-wood light brown, very hard. The wood is well adapted for turning, naves of wheels, and handles of tools.

Popular names.—Burmese : Ngumi ; *Ceylon* : Vakai, Vakal ; *English* : Horse Cassia, Red Cassia, Red Indian Laburnum, Roxburgh's Cassia ; *Malayalam* : Katakkonn ; *Sinhalese* : Ratuwaa ; *Tamil* : Iragattukkondrai, Karungondrai, Kattukkondrai, Kirudam, Kondrai, Mirinji, Narrikkondrai, Semmurungai, Sengondrai, Simaikkondrai, Sivappukkondrai, Sivattam, Tuvigayachin, Varibadi, Varikkondrai ; *Telugu* : Ettamunaga, Simarela, Uchakayamanu, Urimidi, Uskiamen.

The Horse Cassia.

Cassia grandis Linn. f.

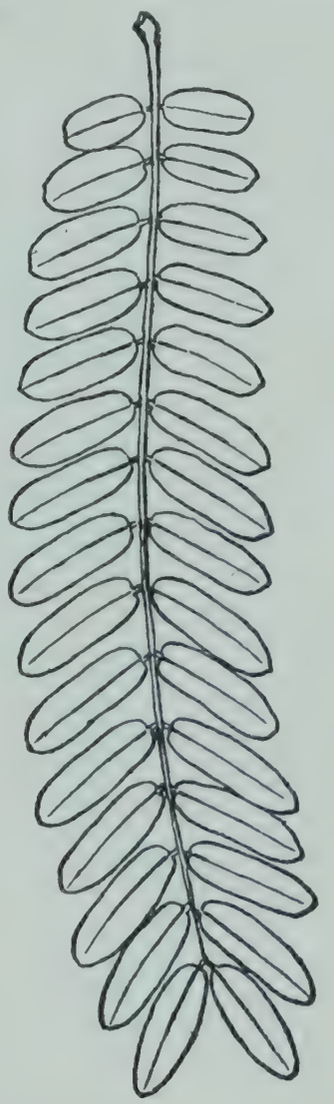
Description.—The Horse Cassia is common in Bombay. It is a small tree with deep green foliage. The terminal leaflets on the younger leaves have a coppery tinge which is very distinctive. The leaves are velvety to the touch as they are finely hairy above and below. A leaf contains from 10 to 20 oblong leaflets abruptly rounded at both ends. The flowers are rose coloured ; they grow in the axils of the leaves in drooping racemes. There are no bracts

at the base of the flower stalks. The pod is 3 in. or less in length, compressed, cylindrical, smooth, and transversely wrinkled.

Flowering season.—The Horse Cassia flowers in February and March when it has lost its foliage.

Distribution.—A native of Tropical America ; grown in many tropical countries.

Uses.—The bitter pulp is used as a purgative.



Popular names.—Brazil : Canna Fistula dos Grandes, Mari-mari ; *English* ; Horse Cassia, Pink Shower ; *French* : Casse du Brésil ; *French Guiana* : Casse : *Spanish* : Casia del Brasil.

Cassia multijuga Rich.

This is a small South American Cassia which was introduced into Bombay from Peradeniya, Ceylon. Its leaves contain from 20 to 25 pairs of oblong-elliptic leaflets, hence the name *multijuga* which means many pinnæ or leaflets. The leaflets are a bright green above and very pale, almost white below. The tree bears masses of bright yellow flowers during August and September when it is in full leaf. This is the latest flowering Cassia. The cycle commences with the flowering of the Horse Cassias in February and ends with this species in September.

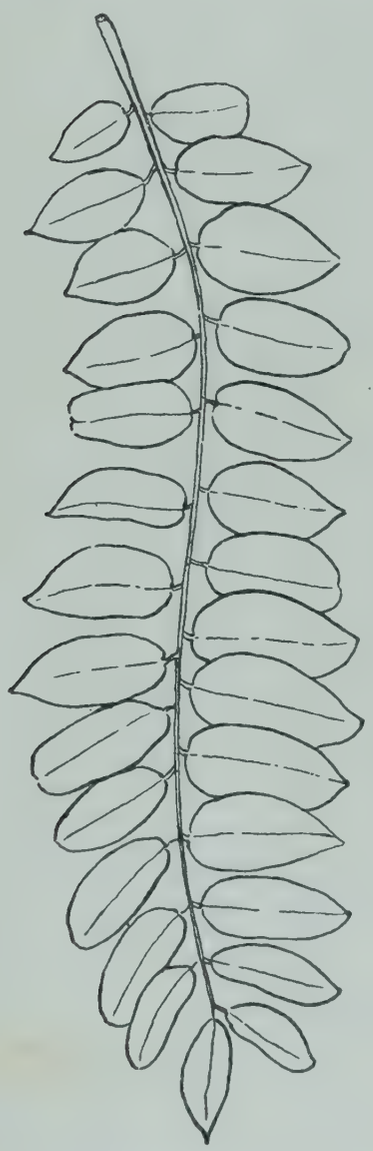
The leaves are utilized like senna leaves.

THE BURMESE PINK CASSIA.

CASSIA RENIGERA Wall.

Renigera means "kidney-bearing" in allusion to the kidney-shaped stipules.

Description.—A small, medium-sized tree growing about 18-20 ft. in height. The tree has a short trunk and a few upright branches which bear numerous slender, drooping branchlets. Clothed in



feathery leaves, they reach downward like great spreading plumes. The leaf is abruptly pinnate ; there is no terminal leaflet to its main stalk. The young leaves spring from large kidney-shaped stipules which are quickly shed. The leaves grow from 4 to 12 in. in length. A single leaf is composed of from 8 to 20 pairs of short-stalked leaflets. They are oblong in shape, rounded at the apex,

THE BURMESE PINK CASSIA.
Cassia renigera, Wall.
(½ nat. size)

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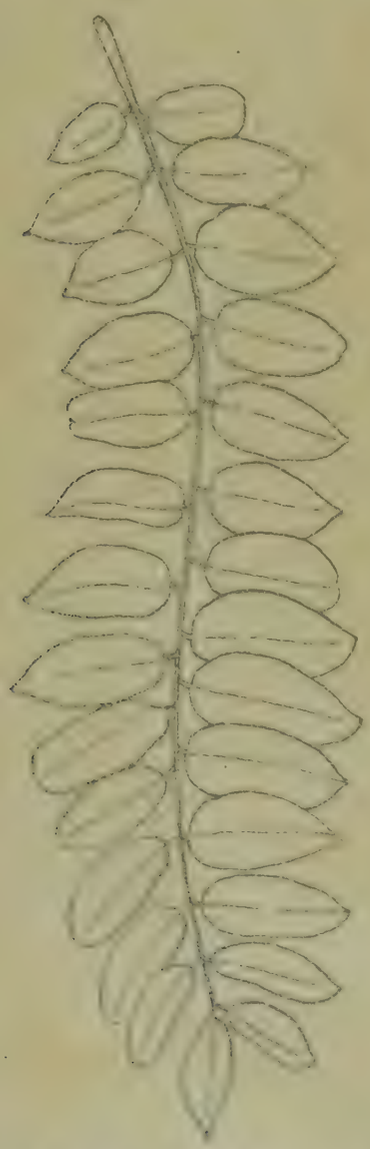

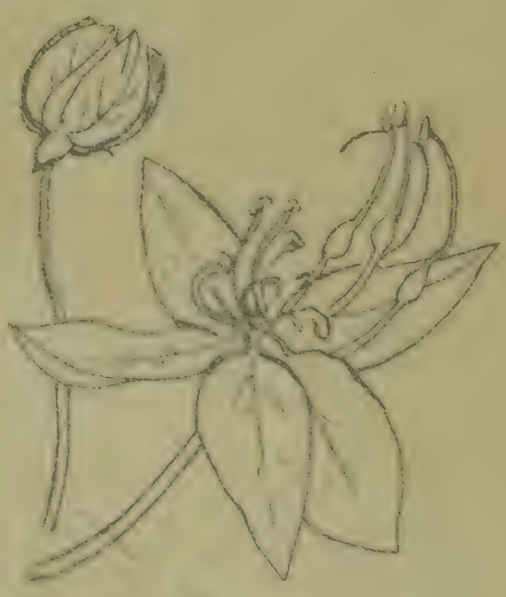

feathery leaves, they look downward like great spreading plumes. The leaf is simply pinnate; there is an terminal leaflet to its main stalk. The young leaves spring from large kidney-shaped stipules which are quickly shed. The leaves grow from 9 to 12 in. in length. A single leaf is composed of from 8 to 20 pairs of short-stalked leaflets. They are oblong in shape, rounded at the apex,

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THE BURMESE PINK CASSIA.
Cassia renigera, Wall.
(½ nat. size)

The Burmese Cassia (*Cassia renigera*) flowering in Victoria Gardens, Bombay.

downy and soft to the touch. Leaf-fall commences during December and by the end of March the tree is practically bare except for a few ragged leaves and the blackened pods which hang from its branches. In April the first buds appear. These open and in a few weeks the branches are smothered in a gorgeous profusion of pink and white blooms. Young leaves commence to spring up, making an assemblage of tender green leaves and masses of pink flowers which is very striking and beautiful. The flowers are large and showy. The older blooms fade from rose pink to white and give the clusters a variegated appearance. Each dense cluster of flowers is borne upon a short sturdy stem. The clusters arise singly or in pairs above the scars of the fallen leaves. Each flower-stalk springs from a downy leaf-like bract. These stalks are deep red in colour and covered with fine white hairs. The sepals which make up the calyx of the flower are dull red externally and tender green within. The petals are a deep pink, oblong in shape and nearly an inch in length. As the flowers commence to fade, the tips of the petals turn white, the pink gradually receding and then fading out altogether leaving the flower white. There are 10 stamens. The largest 3 are swollen at the centre and much curled and crowned with large tender, green anthers. There are 4 smaller median stamens and 3 quite small erect ones. All of these are capped with anthers. The style is long, thread-like and deep red in colour. The pods are very similar to those of the Indian Laburnum. They are quite smooth, cylindrical and grow to 1 ft. or 2 ft. in length.

Flowering season.—The main flowering season is from May to July. Leaf-fall commences during the cold weather and is completed by the end of March and the young leaves sprout in May, shortly after the tree is in full flower. Prain notes that the Shan Hills specimens have yellow flowers.

Distribution.—Dry zone of Upper Burma, now introduced into India and the Malay States.

Gardening.—The Burmese Pink Cassia which is so common in Bombay City was first introduced by the Hon. R. A. Forbes-Sempill, who sent three plants to Mr. Millard from Rangoon about 1902. When the trees flowered, they were so beautiful that other specimens were obtained and, as the tree seeds quite freely, it has become quite common. The tree has not a long life but it grows rapidly. Trees planted from seed in a garden in Salsette in 1923 bore flowers for the first time in 1929 and in 1930 were about 18 ft. in height. The tree is cultivated for ornament. It grows and flowers well even in moist climates like that of Rangoon, Singapore and Bombay, although in its natural habitat this Cassia is accustomed to a dry climate and is capable of growing on comparatively poor soil.

A note by the late Rev. E. Blatter, S.J., with a photograph on *Cassia renigera* when it first flowered in Bombay, in May, 1906, appeared in the *Journal of the Bombay Natural History Society*, Vol. xvii, Part iv, page 1036.

Popular names.—Burmese : Ngusat, Ngushwe, Pwabet ; *English* : Burmese Pink Cassia.

THE YELLOW SILK-COTTON TREE.

Cochlospermum Gossypium DC.

(From the Greek *Kochlos*, a shell, snail, therefore anything spirally twisted ; *sperma*, a seed. *Gossypium*, cotton, in allusion to the silky wool in which the seeds are embedded.)

Description.—The Yellow Silk-Cotton Tree is usually a small or medium-size tree, averaging from 8 to 18 ft. in height. Its erect trunk,

sometimes thicker than a man's body, and covered with smooth ash-coloured bark, supports a heavy crown of numerous branches. The young branches are covered with a soft fine down and marked with great scars of the fallen leaves. The leaves are scattered about the ends of the branches. They are smooth and bright green above and

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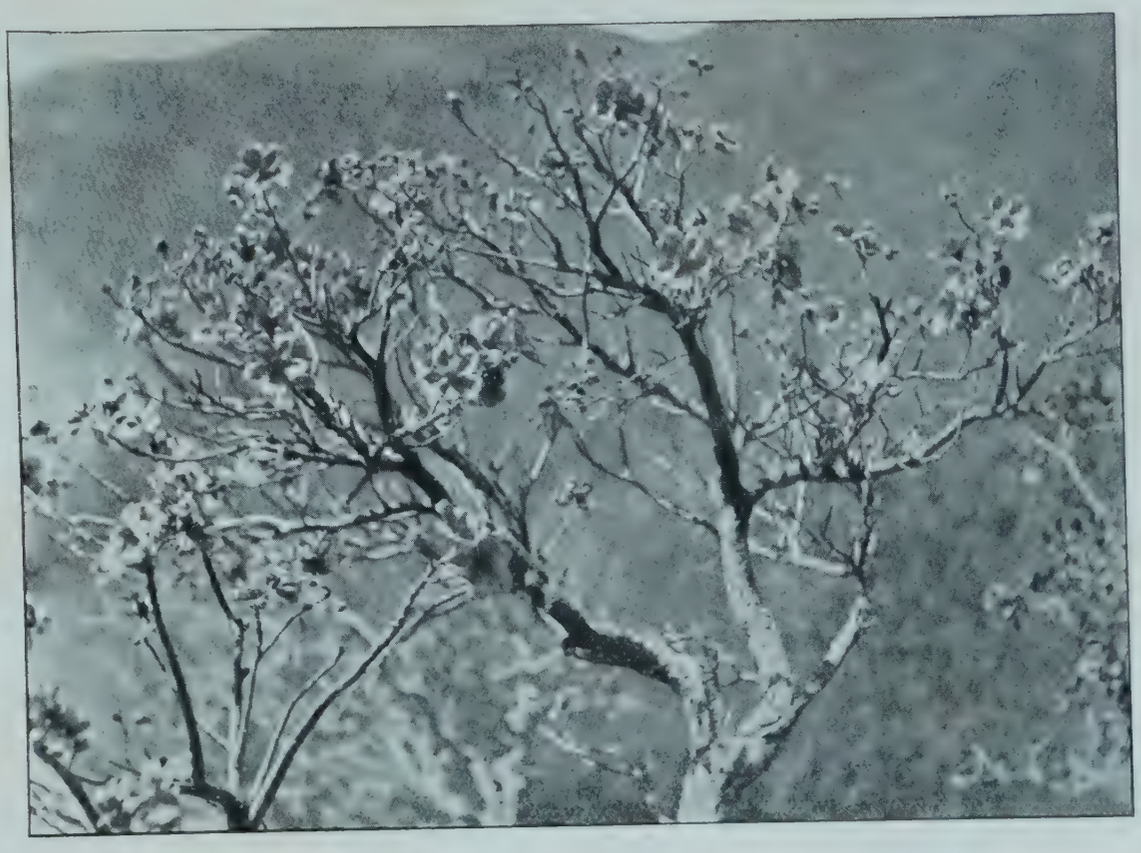
THE YELLOW SILK-COTTON TREE.
Cochlospermum Gossypium, DC.
(½ nat. size)



Yellow Silk Cotton Tree (*Cochlospermum Gossypium*).

Photos by Mrs. G. Cron.

Flowers of the Yellow Silk Cotton Tree (*C. Gossypium*).

grey below, from a covering of whitish down. The leaf is borne on a long thick stalk ; it measures from 3 to 8 in. across the blade and may have from 3 to 5 pointed lobes. The buds appear in small clusters at the end of the branches. Their much contorted, close-packed petals are cupped in a calyx composed of 5 silky, overlapping sepals, which are shed when the buds open. The leafless branches are then decked in a glory of large golden yellow flowers. They stand out against the dark boughs and provide a brilliant note of fresh colour to the bare stony hillsides where these trees mainly flourish. The flower has 5 bluntly-oval, spreading petals with deeply cleft or irregular margins. The stamens are free and numerous, forming with their long red-gold anthers a dense cluster in the centre of the bloom. The dark brown pod is almost as large as a goose's egg. It measures about 2 to 3 in. in diameter, has 5 lobes and contains numerous kidney-shaped seeds embedded in soft silky wool.

Leaf-shedding, flowering and fruiting.—The leaves are shed during the cold season. The flowers appear about the beginning of the hot season at which time the tree is destitute of leaves, but they soon succeed the flowers. The fruit ripens in May and June, the seeds being carried long distances by the strong winds which are often prevalent before or at the beginning of the rains.

Distribution.—Western sub-Himalayas tract from the Sutlej eastwards up to 3,000 ft., Chota Nagpur, Bundelkhand, the drier parts of the Indian Peninsula, and the dry region of Burma. Characteristic of dry hilly country, occupying the hottest and stoniest slopes. Often planted in gardens and near temples. The tree does not occur near Bombay, though quite common in the Khandesh Satpuras and in the hills about Belgaum. It thrives well in gardens and is quick growing.

Economic value.—The Santals prepare a good, useful cordage fibre

from the bark of the tree. The bark abounds in a transparent gum which is largely used by the Indian shoemakers.

The leaves are used for the curious rude leaf-bellows with which the natives of the hills near the Assam valley smelt iron.

The cotton of the pods is used for stuffing pillows.

The seeds yield by hot expression large amounts of a bright red oil.

The wood is soft, and used for firewood and for torches.

Domestic uses.—In the Sambalpur District the wood immersed in water for eight days and the water strained off, mixed with flour and fried, is considered a nutritious food.

In Celebes, the seeds are roasted and eaten ; the young leaves are used to make a cooling wash for the hair.

Medicinal properties and uses.—The gum has the properties in a mild degree of Tragacanth, for which it is proposed as a substitute. It is also used as a mild demulcent in coughs. The floss has been recommended as admirably suited for padding bandages, splints, etc., being soft and cool. On this account it has been suggested as suitable for pillows and cushions used in hospitals, etc. The dried leaves and flowers are used as stimulants.

Popular names.—Arabic : Katira ; *Bengal* : Golgol ; *Betul* : Galgal, Ganiar ; *Bhil* : Ganeri ; *Canarese* : Arasinaburaga, Arisinaburuga, Bettatavare, Buruga, Gagili, Kaduburaga ; *Chota Nagpur* : Sisibaha, Udal ; *English* : Yellow Silk-cotton Tree ; *Gond* : Gangam, Ganiar ; *Gujerati* : Kadachogund ; *Hasada* : Hupudaru ; *Hindi* : Gabdi, Galgal, Gangal, Ganiar, Gejra, Kumbi ; *Kolami* : Golgal, Hupu ; *Lambadi* : Hoghara ; *Madras* : Hill Cotton Tree ; *Malayalam* : Appakutakka, Chempanni, Chimappanni, Panninara, Parapanni ; *Marathi*: Galgal, Ganer, Ganeri, Ganglay, Gongal, Gulgul, Gunglay, Kathalyagonda ; *Naguri* : Galgaldaru ; *Nimar* : Galgal, Ganiar ; *North-Western Provinces* : Gajra, Kumbi ; *Persian* : Gone, Kathira-i-hindi, Kokamara ; *Punjab* : Kumbi ; *Saharampur* : Arlu, Gejra ; *Santali* : Hopo ; *Saora* : Onkur ; *Sinhalese* : Elaimbul, Kinihiriya ; *Tamil* : Kannigaram, Kattilavu, Kattolaga, Kattupanju, Kattuparutti, Kongilam, Kongu, Kumarai, Malaiparutti, Manjardanakku, Nalol, Pachaigiluvai, Palini, Panjittanakku, Pinar, Sudinar, Tanakku, Turumorbalam ; *Telugu* : Adaviburaga, Akshotamu, Buraga, Gungu, Kondagogu, Kongu, Parijatamu, Pratti ; *Udu* : Katira ; *Uriya* : Beniyamrydami, Ganiari, Konokopolaso, Kontopolas, Pobosokoniari.

Photos by

Colville's Glory (*Colvillea racemosa* Bojer).

C. McCann.

Flowers of Colville's Glory (*Colvillea racemosa* Bojer).

John Bale Sons & Danielsson, Ltd London

COLVILLE'S GLORY

Colvillea racemosa, Bojer.

(about ⅓ nat. size)

Colvillea racemosa Bojer.

This tree is a leguminous plant of the family *Caesalpiniaceae*. The name *Colvillea* is in honour of Sir Charles Colville, Governor of Mauritius; *racemosa* on account of the flowers being arranged in racemes.

Description.—A moderate-sized tree 40 to 50 ft. high with spreading branches. In general form and from the character of its foliage it might be easily mistaken for the Gul Mohur (*Poinciana regia*). The leaves of the two trees are very similar. In the present species, the leaf is composed of from 20 to 30 pinnae or minor leaves—a Gul Mohur leaf has only 11 to 18. The pinnae bear 20 to 28 pairs of small elliptical leaflets arranged opposite each other. In the Gul Mohur these leaflets are more oblong.

The flowers are very curious and striking. In the bud they are closed, not like in form and appear in large drooping clusters, the buds diminishing in size as they approach the end of the raceme. The sepals are more or less obliquely shaped in outline and sharply pointed. Externally they are silky to the touch. Their colour ranges from bright orange to red. Internally they are smooth and creamy. The standard petal of the flower is the smallest and not the largest as is usual. It is orange red, and is flanked by two very long narrow erect wing petals, deep red in colour. Opposite the standard petal is the rudimentary boat-shaped keel petal. The 10 stamens are free, 3 of them are inserted below the standard, 2 under the wing petals, 1 under the keel, and 4 under the ovary. The anthers are yellow. The clumps of bright-coloured flowers among the feathery grey-green foliage give the tree a very striking appearance. The pod is 2-valved and round.

Flowering.—In India the tree flowers in July and August, but in Madagascar it flowers in April or May. It grows well in Bombay and flowers there in August or September, the erect flower scapes being very noticeable, standing well above the foliage. "Colville's Glory" is an excellent name for this beautiful tree.

Distribution.—It is supposed to be a native of East Africa, but it was discovered by Bojer, in 1824, in the Bay of Bombatoe, on the West Coast of Madagascar, where a single tree was cultivated by the natives. "That indefatigable naturalist raised it from seeds

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The flowers are very curious and striking. In the bud they are almost nut-like in form and appear in large drooping clusters, the buds diminishing in size as they approach the end of the raceme. The sepals are more or less obliquely shaped in outline and sharply pointed. Externally they are silky to the touch. Their colour ranges from bright orange to red. Internally they are smooth and creamy. The standard petal of the flower is the smallest and not the largest as is usual. It is orange red, and is flanked by two very long narrow erect wing petals, deep red in colour. Opposite the standard petal is the rudimentary boat-shaped keel petal. The 10 stamens are free, 3 of them are inserted below the standard, 2 under the wing petals, 1 under the keel, and 4 under the ovary. The anthers are yellow. The clumps of bright-coloured flowers among the feathery grey-green foliage give the tree a very striking appearance. The pod is 2-valved and round.

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which he took to the Mauritius where it has perfectly succeeded." (*Bot. Mag.* t. 3325, 1834.) It is the only species of the genus.

Gardening.—It is suited to moist or moderately dry low country, and is only propagated from seed. Though it is well worthy of cultivation for its beautiful flowers and foliage, it is seldom seen outside botanical gardens and flower fanciers' collections.

Scarlet Cordia Tree (*C. sebestena*) in the Elphinstone Gardens, Bombay.

Flowers of the Scarlet Cordia (*C. sebestena.*)

THE SCARLET CORDIA OR ALOE-WOOD

Cordia sebestena, Linn.

(about ½ nat. size)

or sepistan, a term which as we have
specific name to the present species.
conspicuous in gardens by its bunches or
scarlet flowers which appear practically

evergreen shrub or small tree, growing from
leaves grow alternately on the branches.
large, oval or elliptic in shape and
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THE SCARLET CORDIA OR ALOE-WOOD

Cordia sebestena, Linn.

about ½ nat. size

THE SCARLET CORDIA OR ALOE-WOOD.

CORDIA SEBESTENA Linn.

Named *Cordia* after Valerius Cordus, an early German botanist, born 1515 ; *Sebestena* means having fruits like sebestens, and sebestens is derived from the Persian Sapistan given to the fruit of an allied species, which grows in the neighbourhood of the town Sebesta.

The genus contains about 230 tropical and sub-tropical species, mostly American ; some are vines, some herbaceous, some yield drugs, and others useful timbers and others again bear edible fruits. The fruit of a common Indian species, *Cordia myxa*, is used in medicine

under the name of *sebesten* or sepistan, a term which as we have indicated above, gave the specific name to the present species.

The tree is rendered conspicuous in gardens by its bunches or clusters of beautiful orange-scarlet flowers which appear practically at all seasons of the year.

Description.—A tall evergreen shrub or small tree, growing from 15 to 30 ft. in height. The leaves grow alternately on the branches. They are from 4 to 6 in. in length, large, oval or elliptic in shape and blunt at the apex. The leaves are rough to the touch, being much

wrinkled, furrowed above and heavily ribbed below. Young plants in fresh verdant green leaf are very handsome. The showy orange-red flowers appear in large open clusters at the ends of the branches. The flower is funnel-shaped, its tubular portion is enclosed for half its length in a heavily ribbed green calyx. Its petals are 6, rounded and heavily wrinkled. There are 5 to 12 stamens crowned with dull yellow elongate anthers which do not protrude beyond the mouth of the corolla. The fruit is $1\frac{1}{2}$ by $\frac{3}{4}$ in. It is pure white and enclosed in a hazel-like husk formed by the persistent calyx.

Flowering season.—January to March. But the tree will be found in bloom throughout the year.

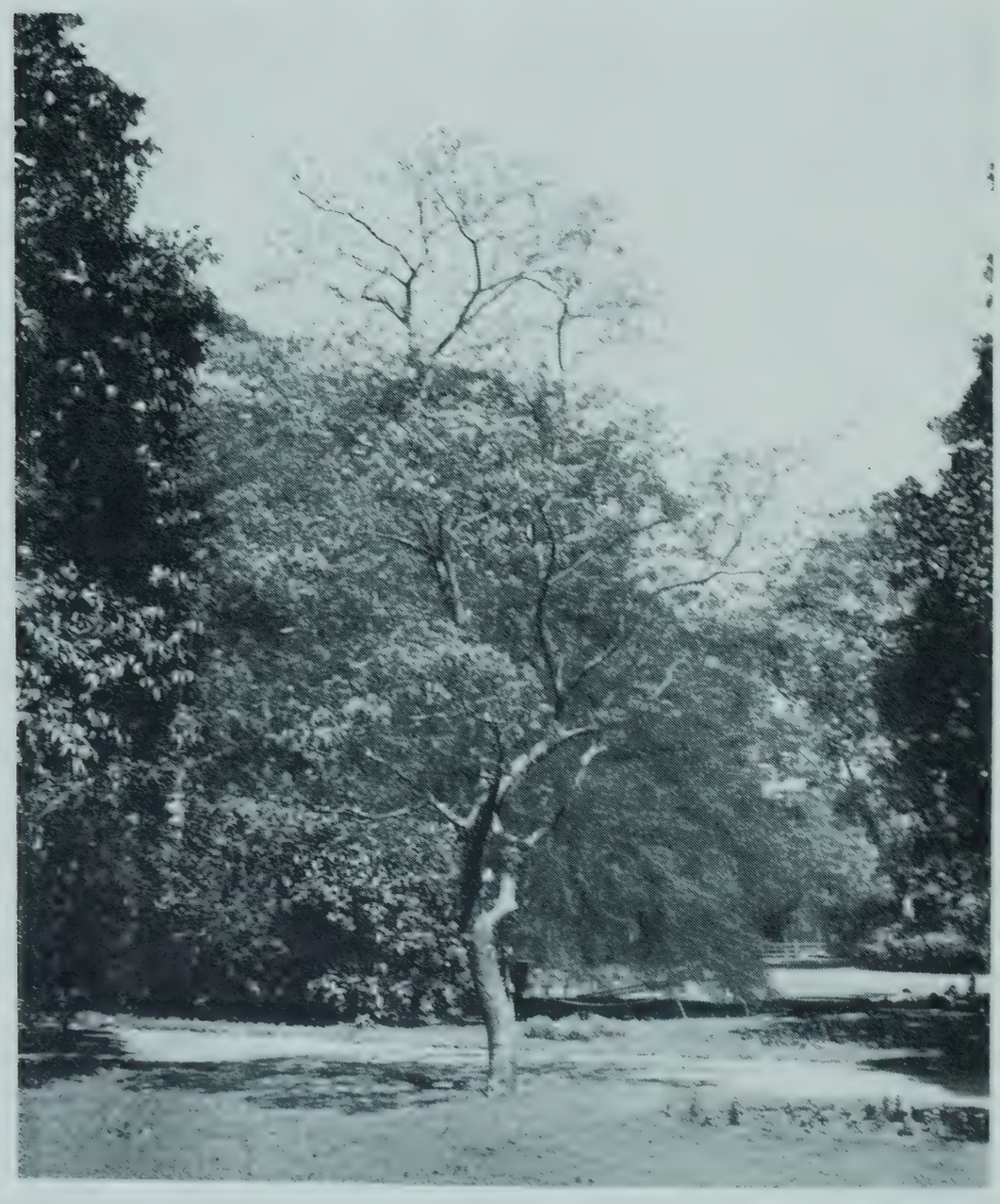
Gardening.—Propagated by cuttings of firm wood and by seeds.

Native country.—Cuba. Belongs to Tropical America, where it is grown from seeds, which are sown when quite fresh.

Uses.—It is useful for decorative purposes.

Popular names.—Canarese : Challekendala, Kempuchalle, Kendala ; *English :* Aloe-wood, Cuba Sebesten, Geiger Tree, Scarlet Cordia, Sebesten Tree ; *French :* Sébestier ; *Tamil :* Achinaruvili, Ponnaruvili ; *Telugu* : Virigi.

Flowers of the Sacred Barna (*Crateva nurvala* Ham.).



Photos by C. McCann

The Sacred Barna (*Crateva nurvala* Ham.).

John Bale, Sons & Danielsson, Ltd London

THE SACRED BARNA.
Cratæva nurvala, Ham.
(½ nat. size)

[illegible]

[illegible]

[illegible] Malayan plant which [illegible] This belongs to the

CAPPARIDACEAE or Caper family.

Crataeva after Cratevas, an obscure writer on medicinal plants, not at the time of Hippocrates, but at the beginning of the first century B.C., since he named a plant after Mithridates. *Nurvala* is an Indian vernacular name.

Description.—The Sacred Barna is a small tree with a much branched head of glossy foliage; its leaves clustering nearly towards the ends of the branches. The tree sheds its leaves during the cold weather. The leaf is trifoliate. It is composed of 3 leaflets growing on a long slender stalk which may be from 1½ to 3 in. in length. The leaflets are from 2 to 6 in. long. Their shape varies from oval to lance-shaped or they taper to a fine point. They are covered with a network of veins, smooth on both surfaces, glossy above and pale, almost white below. The young leaves appear with or sometimes before the flowers. The tree is very handsome when profuse in bloom. The flowers grow in dense greenish-white clusters at the ends of the branches. Each cluster is borne upon a sturdy stalk. The sepals of the [illegible] are small, oval and pointed at the apex. They are green when young; fading to pale pink or yellow. The white petals also fade to yellow. They measure 1 by ⅜ in. There is a very narrow claw petal ¼ in. in length. A bunch of long, thread-like spreading stamens protrude from the flower. They are much longer than the petals and purple or white when young, [illegible] when old. The Sacred Barna is one of a class of plants which is called gynophorous, which means that it bears its ovary at the end of a long stalk. The gynophore in the present species appears like a [illegible] thread 2 in. long with the swollen ovary at the tip. When the [illegible] away the thread-like gynophore remains; it thickens [illegible] woody fruit which contains numerous brown, [illegible]

Distribution.—[illegible] most parts of India and Burma, wild or cultivated. [illegible] streams, but sometimes occurs almost gregariously [illegible] boulder formations in the sub-Himalayan tract [illegible] eastwards. A favourite tree near

THE SACRED BARNA.

Crataeva Nurvala Ham.

Our plant has been known under the name of *C. religiosa* for a long time. This, however, is a Polynesian tree and totally different from the Indo-Malayan plant which has to be called *C. Nurvala* Ham. This belongs to the

Capparidaceae or Caper family.

Crataeva after Cratevas, an obscure writer on medicinal plants, not at the time of Hippocrates, but at the beginning of the first century B.C., since he named a plant after Mithridates. *Nurvala* is an Indian vernacular name.

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Distribution.—Throughout most parts of India and Burma, wild or cultivated. Often found along streams, but sometimes occurs almost gregariously on dry, deep boulder formations in the sub-Himalayan tract from the Ravi eastwards. A favourite tree near

temples and tombs. It is a common tree in Bombay where it is known as "Wai-warna."

Leaf-shedding, flowering and fruiting.—The tree is leafless in the cold season, the new leaves appearing in February and March. The handsome lax-clustered flowers, white, turning yellowish or pale pink, having numerous prominent stamens with purple filaments, appear in March to May (December to April in Southern India ?), and the fruit, a hard-rinded many-seeded berry, 1 to 2 in. in diameter, ripens in the rains (about August in Northern India). The seeds are about $\frac{1}{5}$ in. in diameter, somewhat compressed, helicoid-reniform or irregularly circular, dark-brown ; testa hard but splitting readily along a suture round the seed.

Gardening.—Although often found in moist shady places the tree

is more a light demander than a shade-bearer. It is partial to loose deep alluvial soil near streams, while its long taproot enables it to grow on deep boulder formations where water is at some depth. It is sensitive to frost, at all events in its early stages. It produces root-suckers freely.

Two conditions favourable for natural reproduction are bare ground and sufficient moisture. Seed scattered in grass or among weeds both on moist and on dry ground, or in dry situations on bare soil, persistently failed to germinate, while if scattered on moist bare ground it germinated both in the open and under dense shade, though in the latter case the shade soon killed off the seedlings.

Seed should be sown at the time of ripening, in the rains, on deep loose soil kept sufficiently watered, or in deep pots or boxes, and transplanted during the following rains. The seed may not germinate, even if kept regularly watered, until about May or June of the year after sowing, in which case the plants will be ready for transplanting about August or early September ; they are then ordinarily about 3 to 6 in. high. Owing to the long taproot care is necessary in transplanting.

Economic value.—Wood yellowish-white, when old, turning light-brown, moderately hard, even-grained. Used for drums, models, writing-boards, combs, and in turnery. In Trichinopoly it is also used for making planks and as firewood.

(1) The fruit is edible.

(2) The pulp mixed with mortar makes a cement, and the rind is used as a mordant in dyeing.

Medicinal properties and uses.—The bark is demulcent, antipyretic, sedative, alterative, and tonic ; and the fresh leaves and root-bark are rubefacient.

The bark is useful in some cases of urinary complaints and fever, and in some mild forms of skin diseases in which sarsaparilla is generally resorted to. It also relieves vomiting and other symptoms of gastric irritation. The fresh leaves and root-bark, particularly the former, are very efficacious in all the affections in which mustard poultice is indicated.

" Bruised well with a little vinegar, lime-juice or hot water and applied to the skin in the form of a poultice or paste, the fresh leaves of *C. religiosa* (*C. Nurvala*) act as a rubefacient and vesicant so efficiently that I do not hesitate in saying that they are not only much superior to the mustard seeds in this country, but also quite equal, if not superior, to the flour of that drug imported from Europe. From 5 to 10 or 15 minutes is the time required for them to produce their full effect as a rubefacient, and if kept longer than this in contact with the skin they begin to act as a vesicant. The existence of one or two plants of *C. religiosa* (*C. Nurvala*) in each Hospital or Dispensary garden will certainly save them from the cost of the supply of European mustard for external use.

" The fresh root-bark of this plant is also a very good rubefacient and vesicant, but it is rather too dear and not procurable in large quantities. The bark of the stem is very thick (from 1 to 2 in. when fresh, and from $\frac{1}{2}$ to 1 in. when dry), greenish-brown on the outer side, and grey or pale-white internally and on the inner side, and almost tasteless and odourless. It is one of those barks which can easily be reduced to a coarse powder immediately after its removal from the stem " (Moodeen Sheriff).

The bark of the stem and root of this plant constitute the principal medicine of the Hindoo Pharmacopœia for calculus affections. It is said to promote the appetite, decrease the secretion of the bile, act as laxative and remove disorders of the urinary organs.

In Bombay, the leaves are used as a remedy for swelling of the feet, and a burning sensation in the soles of the feet. The leaf-juice is given in rheumatism in the Konkan, in doses of $\frac{1}{2}$ to 3 tolas, mixed

with coconut juice and *Ghi*. In caries of the bones of the nose, the leaf is smoked and the smoke exhaled through the nose. The bark and the leaf pounded and tied in a cloth are used as a fomentation in rheumatism.

The bruised roots, leaves and seeds are applied to the wounds in snake-bite. Neither the bark nor the leaves are an antidote to either snake or scorpion venom (Caius and Mhaskar).

Popular beliefs.—This tree is found planted near tombs in several different parts of the world.

Popular names.—Bengal : Barun, Tiktoshak, Varuna ; *Bombay* : Bhatavarna, Hadavarna, Kawan, Kumla, Vayavarna, Waruna ; *Burma* : Kadat, Kadet, Katat ; *Canarese* : Bilpatri, Bitusi, Hoddelenage, Mavilinga, Narave, Neravambele, Neravele, Nervala, Tudemadirenge, Vitusi ; *Central Provinces* : Bel, Bela ; *Chinese* : Pa Yeh ; *Coorg* : Nerajane, Nirajani, Nerujani, Vittasi, Vitusi ; *Gujerati* : Varno, Vayavarno ; *Hansot* : Kagdakeri ; *Hindi* : Barna, Barua, Barun, Bila, Bilasi, Biliana, Varuna, Varvunna ; *Konkani* : Nervol ; *Lao* : Mai fuk koom ; *Lepcha* : Purbong ; *Malay* : Cadat ; *Malayalam* : Kili, Niravila, Nirumaliyan, Varana, Vitusi ; *Marathi* : Haravarna, Karvan, Kumla, Nirvala, Ramala, Varun, Vayavarna ; *Mechi* : Bunboronda, Tailadu ; *Punjab*: Barna, Barnahi ; *Rajputana*: Barna, Barnahi ; *Saharanpur* : Barna, Bilarsi, Brarka ; *Sanskrit* : Ajapa, Ashmarygna, Barhapushpa, Kumaraka, Mahakapittha, Marutapaha, Pasunadha, Sadhuvriksha, Setuka, Shikhimandala, Shvetadruma, Tamala, Tiktashaka, Urumana, Varuna, Vasaha ; *Sinhalese* : Lunuwarana ; *Tamil* : Adicharanam, Adimalam, Anjani, Inaivilai, Kattumavilangai, Kavilam, Maluram, Maralingam, Mavilangai, Miguttiyal, Narvala, Nilluvam, Nirumaliyam, Periamavilangai, Shuppigam, Shuvedan, Sinnamavilingam, Tiriburamerittan, Varanam, Villuvam ; *Telugu* : Bilvaram, Chinnavulimidi, Magalingam, Maredu, Peddamagalingam, Peddavulimidi, Tellavulimidi, Ulimidi, Urumudu, Usiki ; *Urdu* : Barna ; *Uriya* : Barun, Boryno, Varuna.

Flower of *Dillenia indica*, from a tree in the People's Park, Madras. July, 1935.
(About ⅓ nat. size.)

John Bale Sons & Danielsson. Ltd London.

THE LARGE FLOWERED DILLENIA.

Dillenia indica, Linn.

(about ⅓ nat. size)

[illegible] LARGE-FLOWERED [illegible]

[illegible]

[illegible] of 30 or 40 ft. Its spreading branches [illegible] of handsome bright green foliage. [illegible] thick. It peels off in small hard scales. [illegible] grow at the ends of the branches. [illegible] about 1 to 2 in. long, its base partially [illegible] An average leaf is 8 to 12 in. long [illegible] lance-shaped with a finely pointed apex and [illegible] The close-set nerves running [illegible] teeth give the leaves a beautiful [illegible] part of the leaf and the nerves [illegible] The large fragrant white flowers [illegible] branches. They may [illegible] stalk of the flower is 3 in. long, round and [illegible] The [illegible] composed of five fleshy rounded concave sepals, which persist and form the outer covering of the fruit. The five large petals are oblong and heavily crinkled. The [illegible] a yellow crown round the white spreading rays of the [illegible] The fruit is large and hard, with the sepals which surround [illegible] from 3 to 4 in. across. Internally it is fleshy and in [illegible] the seeds are embedded [illegible]

[illegible]—The flowers appear in [illegible] July.

[illegible] of the eastern [illegible] and of the Indian Peninsula. [illegible] tropical forest streams and rivers [illegible] moist soil.

[illegible] and those which drop into the [illegible] banks are carried down until [illegible] fruits, and are possible agents in [illegible] conditions, however, the [illegible] the fruit owing to the rigid [illegible] Nature's method of overcoming the [illegible] on reaching the ground quickly turns [illegible] season, shrivels into dry masses. [illegible] fill the dry shell with earth. The seeds [illegible] and at the commencement of the rains they [illegible] accumulated by the white ants, [illegible]

THE LARGE FLOWERED DILLENIA.

Dillenia indica, Linn.

(about ⅓ nat. size)

THE LARGE-FLOWERED DILLENIA.

DILLENIA INDICA Linn.

An erect evergreen tree which in favourable localities grows to a height of 30 or 40 ft. Its spreading branches form a rounded crown of handsome bright green foliage. The bark is smooth, red and moderately thick. It peels off in small hard scales. The leaves grow at the ends of the branches. The leaf-stalk is channelled, about 1 to 2 in. long, its base partially encircling the supporting branch. An average leaf is 8 to 12 in. long and 4 in. in breadth. It is oblong lance-shaped with a finely pointed apex and sharply toothed margin. The close-set nerves running in regular parallel lines to the marginal teeth give the leaves a beautiful deeply fluted surface. The upper part of the leaf and the nerves beneath are covered with fine hairs. The large fragrant white flowers appear singly at the ends of the branches. They may exceed 6 in. in diameter. The club-shaped stalk of the flower is 3 in. long, round and smooth. The calyx is composed of five fleshy rounded concave sepals, which persist and form the outer covering of the fruit. The five large petals are oblong and heavily crinkled. The numerous stamens form a yellow crown round the white spreading rays of the stigma. The fruit is large and hard, with the sepals which surround it—it measures from 3 to 4 in. across. Internally it is fleshy and its many flat seeds are embedded in a glutinous pulp.

Flowers.—The flowers appear in June and July.

Distribution.—Moist and evergreen forests of the eastern sub-Himalayan tract, Assam and Burma, and of the Indian Peninsula. Chiefly found along the banks of tropical forest streams and rivers and other damp places, on deep rich moist soil.

The fruits are buoyant in water, and those which drop into the streams from the trees along their banks are carried down until stranded. Wild elephants eat the fruits, and are possible agents in the spread of the seed. Under ordinary conditions, however, the seed has no means of escaping from the fruit owing to the rigid covering of the thickened sepals, and Nature's method of overcoming the difficulty is interesting. The fruit on reaching the ground quickly turns brown, decays and, in the hot season, shrivels into dry masses. White ants eat out the interior and fill the dry shell with earth. The seeds, however, remain untouched, and at the commencement of the rains they germinate in the earth accumulated by the white ants, and the seedlings burst through the many cracks and joints of the dried shell.

Gardening.—The plants are propagated from seed sown during the rains, in June and July ; they propagate with difficulty from cuttings. The tree reproduces satisfactorily from coppice-shoots, as in the Holongapar coppice coupes in Assam. The growth is moderately fast. The tree cannot be cultivated on the hills in Northern India.

Economic uses.—The tree is planted as an ornament ; it is the showiest of the whole family, being equally attractive in foliage, flower and fruit.

Both the *Tassar* (*Tussore*) and *Atlas* moth silk-worms are said to feed upon the leaves.

The bruised bark is used for tanning.

The wood is red with white specks, close-grained, moderately hard, durable under water, weighing 40 to 45 lb. a cubic foot. It is used to make helves and gunstocks, and in construction. It makes good firewood and charcoal.

Domestic uses.—The fruit, as it hangs upon the tree, resembles enormous green apples of the size nearly of a child's head. They are gathered for use when full grown. The part made use of for the table is not the fruit itself but the large, thickened sepals of the calyx, by which it is firmly enclosed. Tasted raw these have the exact flavour of a very sour unripe apple ; and when cooked with sugar they have also exactly the flavour of the same fruit cooked in the same way. The great objection to them is the large quantity of fibres they contain. They are very commonly mixed as an ingredient in curries, especially prawn-curries, to which they impart a most agreeable flavour. They are also made into a pleasant jelly. The acid juice sweetened with sugar forms a cooling drink.

Medicinal uses.—The bark and the leaves are astringent. The bruised bark is applied as a cataplasm in arthritis.

The unripe fruit is said by Ayurvedists to be sour, bitter, and pungent ; the ripe fruit is described as sweet, sour, tasty. The fruit regulates the heat of the body, tones up the nervous system, dispels fatigue, and stops abdominal pain.

Vernacular names.—Assam : Chalita, Otengah ; *Bengal* : Chalita, Chalta, Hargesa, Ruvya ; *Bombay* : Karambel, Mothakarmel, Mothekaramala ; *Burma* : Thabyu, Thibuta, Zinbrun, Zinpyunngan ; *Canarese* : Bettadakanagal, Bettakanigala, Ganagalu, Kadkanagula, Kanagala, Kanigala, Neyitaku ; *Deccan* : Mutakurmul ; *Garo* : Panpui ; *Gujerat* : Karmbal, Otaphal ; *Hindi* : Chalta, Chaltr, Gilnar, Girnar ; *Indo-China* : Dok shan, So ba ; *Kachin* : Masang ; *Kolami* : Korkotta ; *Konkani* : Corombol ; *Lepcha* : Kyangmozhu, Phanisikol, Phan-se kung ; *Magahi* : Chauralesi, Thapru ; *Malay* : Chimpuh, Simpoh ; *Malayalam* : Chalita, Punna, Syalita, Valapunna ; *Marathi* : Karmbel, Motakarmal, Motakarmbal ; *Monghyr* : Chilta ; *Mundari* : Korkotadaru, Karkutadaru ; *Nepal* : Panchkule, Panchphal, Ramphal ; *Sanskrit* : Bhavya, Ruvya ; *Santal* : Korkot, Korkotta ; *Sinhalese* : Houdapara, Wampara ; *Taleing* : Carllow ; *Tamil* : Akku, Ugakkay, Uva, Uvav, Uvatteku ; *Telugu* : Kalinga, Peddakalinga, Uvva ; *Uriya* : Chalota, Oao, Ou, Rai, Uau.

A.

The genus was named by Linnaeus for J. J. Dillenius (1684-1747), botanist and professor at Oxford, author of important botanical works.

Dillenias are all tropical trees thriving in light sandy loam. The acid sepals and sweet carpels of many of them are eaten, either raw or cooked, and made into jellies and cooling drinks.

B.

The DILLENIACEAE are astringent and some are so used medicinally. The fruits of a very few are acidulous ; others are reputed tonic stimulants.

THE INDIAN CORAL TREE

Erythrina indica Lam.

1. Erythrina indica.

Description.—A moderate-sized tree, reaching 60 ft. in height, with a straight trunk and numerous branches. The branchlets are armed with small, dark-coloured conical prickles up to third or fourth year. The bark is thin, yellowish or greenish-grey, smooth, shining, with longitudinal whitish cracks. It exfoliates or peels off in papery flakes.

This figure illustrates the leaf, which is composed of three leaflets, the terminal one being the largest. The leaf stalks and leaves are

without prickles. The leaflets are covered with star-shaped hairs when young but are hairless when mature. The flowers, which are large and numerous, of a bright dazzling scarlet, growing in a single or in several racemes, at the ends of the branchlets, appear before the leaves and are arranged in clusters, one to three blooms emerging from a common stalk.

The diagram on the next page, illustrates the composition of the flower and the appearance of the bud. The segments which form the calyx of the bud are fused to form a tube which is narrowed at the apex and ends in 5 points, 2 of which are distinct and extend beyond the tip. When the bud opens the calyx splits down the back to the base and forms an open sheath. The corolla, it will be seen, is composed of

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Erythrina indica. Lam.
(1/3 nat. size)

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INDIAN CORAL TREE
Erythrina indica, Lam.
(1/2 nat. size)

The Coral Tree (*Erythrina indica*) in flower.

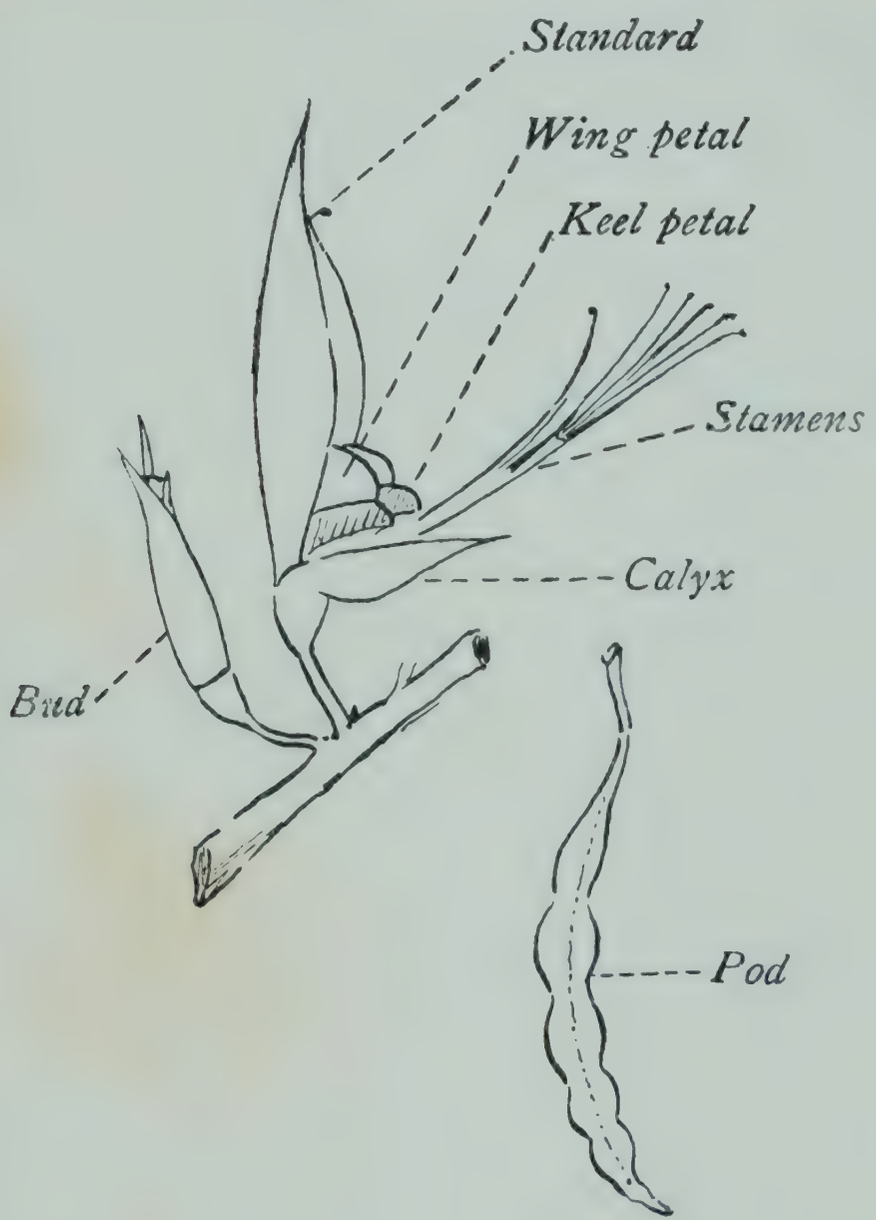
The prickle-covered stem of the Silk Cotton Tree (*Bombax malabaricum*).

ACC No. 3196

5 petals : an erect, oblong standard which narrows at the base into a claw, two small wing petals and two, almost similar-sized, keel-petals of a distinctly darker hue. The wing petals partially enclose the keel.

The stamens protrude for almost their entire length. They are united into a bundle at the base ; higher up, the tenth stamen is distinct and free.

The pods, which are many, grow on a stout stalk and attain a length of 5 to 12 in. They are somewhat curved, constricted between



the seeds, beaked at the tip, and narrow down to a seedless base. When dry they are black and wrinkled. The pod contains from 1 to 12 seeds.

The seed is oblong, smooth, its colour varies from red or dark-red to purple or dark-purple or brown.

In Vol. xxxiii, page 460, of the *Journal of the Bombay Natural History Society*, Mr. T. C. N. Singh has described how the Mynahs (*Acridotheres tristis tristis*) promote pollination of the flowers of the Coral-tree in Lucknow. The Editors have pointed out that in

Western India a great variety of birds are regular visitors of the Coral-tree when in flower, contributing thus to its pollination. Among the birds to be invariably met with, in addition to the Mynah and the Crow, are mentioned the Rosy Starling (*Pastor roseus*), Babblers (*Turdoides*, *Pyctorhis*, and *Dumetia*), Drongo (*Dicrurus*), Wren Warblers (*Prinia socialis* and *inornata*), Tailor Bird (*Orthotomus sutorius*), Bulbuls (*Otocompsa*, *Molpastes*, *Pycnonotus* and *Chloropsis*), Grey and Black-headed Mynahs, Black-capped Blackbird (*Merula nigropileus*), and the Tree Pie (*Dendrocitta*).

Flowers from February to May before the young leaves appear.

Fruit ripens from May to July.

The old leaves are shed early in autumn.

Distribution.—Reported to be indigenous inland in deciduous forests of Thana, the Konkan, North Kanara and Malabar, and from the Sunderbunds along the coast through Arakan, Pegu, Tenasserim, the Andamans and Nicobars, Java, Polynesia. On the west coast it is found above high water, and, according to Talbot, sometimes associated with *Calophyllum inophyllum*, *Salvadora persica*, *Clerodendron inerme*, *Grewia microcos*, *Canavalia ensiformis*, *Derris uliginosa*. In the Andamans it grows together with *Mimusops littoralis*, *Calophyllum inophyllum*, *Thespesia populnea*, *Terminalia Catappa*, *Heritiera littoralis*, *Afzelia bijuga*, *Pongamia glabra* and *Hibiscus tiliaceus* (Troup). Haines thinks it may be wild in Khurda where the tree is very common.

Otherwise this species is cultivated and self-sown all over India, in hedge-rows in Bengal.

Cultivation.—In Indian agriculture it has been employed from the most ancient times as a shade tree. It was a universal belief that the soil benefits by its presence, and it has been known for centuries that other leguminous plants also have beneficent effects on the ground in which they have been cultivated. The Romans were aware of the fact that cereal crops grow better in soil which has been under vetches the year before, and they made use of the knowledge in their system of rotation. It was only about fifty years ago that nodules were discovered on the roots of leguminous and certain other plants which contain large numbers of a living organism, *Bacterium radicicola*, which possesses the property of fixing atmospheric nitrogen.

The tree is much used in India for the support of betel pepper, black pepper, and grape vines ; also as a prop for the jessamine plant. In La Reunion it is employed to support the vanilla. What renders the tree very proper for this purpose is its quick growth (from cuttings), its firm, permanent, smooth bark, which gives a strong hold to the roots of the vine ; and lastly, it is full of leaves and very shady during the hottest months of the year, so it shelters the vine from the intense heat of the sun and keeps the ground moist. As soon as the hottest weather is over, the leaves drop and expose the vine to the sun and weather during the cool season.

In some districts of Bengal the Betel-nut Palms are planted in groves of *Erythrina indica*. These enrich the soil, afford shade from the intense heat, and protection from sudden wind storms. Coffee

planters in Assam appreciate, for the same reason, several species of *Erythrina* (*E. indica*, *E. subumbrans* and *E. suberosa*). Also Tea plantations derive advantages from the presence of *Erythrina*.

The Indian Coral Tree is adapted for ornamental purposes, and for making hedges and fences ; from being armed with numerous prickles, it serves as an excellent hedge-plant to keep cattle from cultivated gardens.

The loppings are valuable as green manure.

It propagates readily from seeds or cuttings ; cuttings 6 ft. long by 3 in. across root readily when planted.

The following varieties or forms of *Erythrina indica* are grown in Indian gardens :—

Var. *picta* Hort.

The leaves are variegated.

Var. *parcellii* Hort.

Has leaflets with variable yellow variegation. The flowers are bright cinnamon-red.

This plant is very showy when young and is easily propagated by cuttings.

Var. *marmorata* Hort.

It has large leaves attractively spotted with white.

Var. *alba*.

This is a white-flowered form.—Nairne (*Flowering Plants of Western India*, p. 87) mentions it as occurring in Salsette, near Bombay. We have seen a specimen in the Victoria Gardens of Bombay.

Sir George Birdwood, in his book "Sva" (pp. 32-33) mentions that the white variety of the *pangri* (*Erythrina indica*) was first discovered near the ruined Hindu temple at Chimbur (near Trombay—Bombay Suburban District) by a Mr. Bhasker, the *karbhari* of the Victoria Gardens. He claims that he himself was responsible for propagating innumerable cuttings from this tree in the Victoria Gardens, Bombay, and for distributing them widely, even so far as Egypt.

According to him this was the only place in the world where the white variety existed, and seemed to him, for what reasons he does not state, "a distinct relic of the ancient Buddhists, who, as their grove at Lanouli (W. Ghats) shows, were enthusiastic arboriculturists."

In addition to the Victoria Gardens and other localities in Bombay, the white variety may, at the present day, be found growing in the Empress Gardens, and Bund Gardens, Poona and in the Native lines at Satara.

Economic value.—The tree yields a dark-brown gum of little importance.

The bark is used in dyeing and tanning ; it yields an excellent cordage fibre of a pale straw colour.

The dried red flowers on being boiled yield a red dye.

The wood is light and soft, weight 18 to 26 lb. per cubic foot, fairly durable, does not warp or split, particularly applicable to many purposes for which deal is employed. In India it is used for making scabbards, light boxes, toys, sieve frames, trays, planking, jars for household purposes, and ware to be covered with lacquer. Carpenters prefer it to all others for the poles of palanquins, and they generally employ it for the construction of rafts, fishermen's floats, canoes, and catamarams.

In Guam the wood is used for making troughs. In Samoa the natives use it for the outriggers of their canoes.

Domestic uses.—The tender leaves are eaten in curry. In the Trichinopoly District the leaves are used as a cattle fodder. In Indo-China they are commonly used to wrap minced meat. In Samoa the wood, when dead and dry, is used for keeping fire in the houses, as it will smoulder a long time without going out.

In Samoa and in other islands of the Pacific the natives reckon the change of seasons by the flowering of this tree.

Medicinal properties and uses.—Various parts of the tree are used by Ayurvedists. Sushruta recommends the plant for the treatment of snake-bite, but Mhaskar and Caius have shown experimentally that the root, the bark and the leaves are equally useless in the antidotal treatment of colubrine and viperine bites.

Popular beliefs.—The Indian Coral Tree is supposed to flower in Indra's garden. An episode in the Puranas relates the quarrels of Rukhmini and Satyabhama for the possession of the flowers which Krishna had stolen from the garden. The leaf is supposed to represent the Hindu trimurti, the middle leaflet is Vishnu, on his right is Brahma, and on his left Shiva. The Portuguese have named them " Folhas da Trindade."

Popular names.—Bengal : Palitamadar, Palitamandar, Paltemandar ; *Berar* : Pangara, Pangra ; *Bicol* : Cabrab ; *Burma* : Kathit, Pinlekathit ; *Cachar* : Madar ; *Canarese* : Bilivarijapa, Halivana, Halivara, Hongara, Hongaraka, Kempuvarijapa, Mandara, Mullumurige, Mullumutala, Nimbataru, Palivana, Parijata, Parivala, Parivana, Salaki, Varijapa, Warjipe ; *Cantonese* : Hoi T'ing ; *Chinese* : Hai T'ung ; *Cuba* : Piñon ; *Cutch* : Arduso ; *English* : Bastard Teak, East Indian Coral Tree, Indian Coral Tree, Mochi Wood, Red Bean Tree ; *Formosa* : Tz'u t'ung ; *French* : Arbre à pois cafre, Arbre au corail, Baracara, Bois de corail, Bois immortel, Bois rouge, Colorin, Cypre à corail, Erythrine au corail, Immortelle ; *French Guiana* : Erythrine à graine de corail, Immortelle ; *German* : Korallenbaum ; *Ghatwal* : Hadbad ; *Guam* : Gabgab, Gaogao, Gapgap ; *Gujerati* : Bangaro, Panaraweo, Panarvo, Panderavo ; *Hindi* : Mandara, Paltamandar, Pangara, Pangra, Panjira, Pharad ; *Ilocano* : Bagbag ; *Indo-China* : Thich dong, Vong, Vong nem ; *Kharwar* : Pharar ; *Kolami* : Birsing ; *Konkani* : Pangaro, Panghra ; *Lambadi* ; Karakalli ; *La Reunion* : Nourouc, Pignon d'Inde de l'Inde ; *Magahi* ; Katheik ; *Malaya* : Dapdap, Hoi ting ; *Malayalam* : Kalyanamurikku, Karimurikku, Kulmurikku, Mandaram, Murikku, Nimbataru, Paribhadram ; *Marathi* : Mandar, Pangara, Pangra, Pangaru, Phandra ; *Matheran* : Pangara, Paranga ; *Mundari* : Edelkirum, Kirum, Kirumedel, Sirumedel ; *Pampangan* : Dapdap, Sulbang ; *Philippines* : Bubug, Cosindic, Dapedape, Selbang, Telbong ; *Portuguese* : Folhas da trindade, Ponguero ; *Rarotonga* : Gatae, Ngatae ; *Samoa* : Gatae, Ngatae ; *Sanskrit* : Bahupushpa, Kantaki, Kantakinshuka, Krimighna, Krimishatru, Mandara, Nimbataru, Palasha, Palitmandara, Paribhadra, Parijata, Prabhadraka, Raktakeshar, Raktakusuma, Raktapushpa ; *Santali* : Marar, Mararbaha ; *Saora* : Baditi ; *Sinhalese* : Erabadu, Ettabadu ; *Spanish* : Arbol del coral ; *Tagalog* : Cabrab, Carapdap, Casindic, Dapdap ; *Tamil* : Kaliyanamurukku, Kavir, Muchi, Mullumurukku, Murukku, Palasam, Palasu, Parisadam, Savusayam, Sinsugam, Vallai, Venittu ; *Telugu* :

Badida, Badisa, Badita, Baditi, Baridamu, Mahameda, Modugu, Muchikatta, Paribhadrakamu, Paribhavyamu, Parijatamu, Rohinamu ; *Tulu* : Pongare ; *Uriya* : Mondaro, Palodhua, Salotonya ; *Visayan* : Cabrab, Dapdap.

A. Erythrina Linn.

(The name is derived from the Greek *erythros* red, alluding to the colour of the flowers which are mostly red.)

Erythrina is a genus of papilionaceous trees and shrubs, popularly known as Coral-trees, but also represented by herbs. About 50 species have been found in tropical and warm temperate regions. Some attain great dimensions, while others are dwarf bushes with a woody rootstock, or even herbs. In many the stems, branches and leaf-stalks are beset with prickles. The leaves consist of 3 leaflets, with the lateral leaflets opposite to each other. The flowers are large, mostly red, and arranged along a common stalk (raceme). The calyx is two-lipped or oblique (spathe-like). The standard is sessile or shortly stalked (clawed), upright or spreading, much larger than wings and keel. The stamens are united to the middle, the upper one free or united at the base with the rest. The anthers are equal and the style bent inwards. The fruit is a slender, stalked pod, constricted between the seeds, narrowed at both ends, opening more or less completely into 2 halves ; the seeds are mostly egg-shaped.

The Erythrinas are chiefly remarkable for their brilliantly coloured red flowers, which are usually produced before the new leaves are developed. They are much-prized garden plants. The herbaceous species are propagated by division of the rootstock ; also by cuttings from shoots springing from the old roots. Woody species are propagated by cuttings of growing wood. All species are propagated by seeds, whenever these are obtainable.

In India 8 indigenous species have been observed ; 2 more have been introduced.

Key to the Indigenous Species.

A. Trees

I. Calyx spathe-like, oblique, splitting, not at all 2-lipped.

1. Calyx splitting to the base
   (*a*) Tip of calyx 5-toothed ... ... 1. *E. indica.*
   (*b*) Tip of calyx not toothed ... ... 2. *E. stricta.*
2. Calyx splitting half-way down ... ... 3. *E. mysorensis.*

II. Calyx bell-shaped, more or less distinctly 2-lipped, but not splitting down to the base.

1. Pod swollen, bearing seeds throughout the whole length
   (*a*) Leaflets much longer than broad ... ... 4. *E. fusca.*
   (*b*) Leaflets as broad as long
      * End-leaflet rhomboid or egg-shaped ... 5. *E. suberosa.*
      ** End-leaflet nearly kidney-shaped ... 6. *E. arborescens.*
2. Pod flat, seedless in the lower half ... ... 7. *E. subumbrans.*

B. Undershrubs or herbs ... ... 8. *E. resupinata.*

2. Erythrina stricta Roxb.

A large or moderate-sized tree. Stems with a rougher bark than in *E. indica*. Bark pale, smooth, greenish after the papery exfoliation. Branches armed with numerous sharp, yellow or whitish prickles. Leaves with prickly stalks sometimes 6 in. long ; the two small leaflets at the base of the leaf-stalk sickle-shaped. Calyx $\frac{1}{2}$ in. long, entire at the tip, but splitting to the base down the back, almost hairless. Corolla bright scarlet. Pod 5 to 6 in. long, narrowed at both ends, slightly or not at all constricted between the seeds, compressed, stalked, hairless, often beaked with the slender style. Seeds 1 to 3, light brown.

Flowers.—January to May. The tree is without leaves up to the time of flowering.

Distribution.—Assam, Manipur extending westwards to Nepal, Chittagong, Burma, Orissa, deciduous mixed forests of North Kanara and the Konkan.

Uses.—The wood is white, soft and spongy but tough and fairly durable, weighs about 20 lb. per cubic foot. It is used for fishing-net floats on the West coast of Madras, in the Bombay Presidency for scabbards, planking, and boxes to be covered with lacquer.

The flowers are said to be an antidote to poison.

Popular names.—Burmese : Taung kathit ; *Canarese* : Hemmuruku, Kichige, Muruku ; *Lepcha* : Katiang ; *Malayalam* : Murikku ; *Nepalese* : Phullidha ; *Sanskrit* : Mura ; *Tamil* : Kinjugam, Mandaram, Mullumurukku, Murukku ; *Telugu* : Mullumoduga ; *Uriya* : Shalotonya.

3. Erythrina mysorensis Gamble.

A tree, branchlets apparently without prickles. Leaf-stalk 4 in. long ; stalks of leaflets $\frac{1}{3}$ in. long. Leaflets almost leathery, broadly egg-shaped, abruptly long-pointed at the tip, terminal one 5 in. long, $3\frac{1}{2}$ in. broad, lateral ones 4 in. long and about 3 in. broad, flowers fascicled towards the tips, scarcely $1\frac{1}{5}$ in. long, coral-red. Calyx split half-way down, minutely toothed above.

Nearly related to *E. stricta*, but the flowers are smaller, the wings and keel-petals are of the same length, i.e. $\frac{1}{2}$ in., the stamens are in two bundles.

It resembles *E. indica* in having the wings and keel-petals equal length, but the flowers are very much smaller and the leaves are different.

Flowers.—November.

Distribution.—Chickenalli in Mysore.

4. Erythrina fusca Lour.

A moderate-sized tree. Trunk and branches armed with dark brown or black or pale-coloured and black-tipped, very sharp prickles, arising from pyramidal corky tubercles, and often extending even to the leaves and leaflets. Leaflets 3, much longer than broad. Racemes lax, 5 to 10 in. long, several at the ends of branchlets.

Flowers crimson, mostly 3 in a fascicle. Calyx bell-shaped, splitting irregularly into 2 or more unequal divisions, hairy. Pod 6 to 8 in. long, swollen, bearing seeds throughout, constricted between the seeds at least on one side, finely downy, containing 6 to 8 seeds.

Flowers.—February to May.

Distribution.—Sylhet, Lower Bengal, Plains of Lower Burma, Ceylon, Malay Archipelago, Polynesia.

Popular names.—Bengal : Harikekra ; *Burma* : Kon kathit ; *Indo-China* : Vong dong.

In the Southern portion of Indo-China this plant is used medicinally as a substitute for *E. indica*.

5. Erythrina suberosa Roxb.

A middle-sized tree, 40 to 50 ft. high. Bark corky, deeply cracked. Branches numerous, crooked, spreading, armed with stout, conical, yellowish-white prickles $\frac{1}{10}$ to $\frac{1}{4}$ in. long, which fall off after the third year. Leaves of 3 leaflets, usually unarmed, but sometimes with a few scattered prickles on the stalks. Leaflets pale, 3 to 6 in. long and broad, sometimes broader than long, all more or less hairless above, matted with grey cottony hairs beneath. End-leaflet rhomboid or egg-shaped. Racemes 1 to 4, forming dense heads near the ends of the branchlets, 2 to 4 in. long ; calyx bell-shaped, soon becoming 2-lipped, not splitting to the base. Corolla scarlet. Upper stamen free from low down. Pod stalked, 5 to 6 in. long and $\frac{1}{2}$ in. in diameter, cylindrical, slightly constricted between the seeds, filled when young with spongy tissue between the seeds which finally drops out leaving the seeds attached to the margins of the grey shining valves. Seeds 2 to 5, pale-brown or black, dull, kidney-shaped.

Flowers.—March to June. The pods ripen after May. The old leaves are shed during the cold season. The young leaves appear in March and April, generally shortly before the flowers open.

Distribution.—Wild in the Siwalik tract and lower Himalaya, from the Ravi to the Sarda, ascending to 3,000 ft., occasionally found at 4,000 ft., Oudh, Agra district, Merwara, Burma, Bihar and Orissa, North Circars, Central Provinces, Deccan in dry forests up to 3,000 ft., throughout the forests of the Bombay Presidency, common in some of the Khandesh forests, up to 3,700 ft. in the Akrani, not in the heavy rainfall zone, not uncommon in Southern India. Frequently cultivated.

Uses.—The wood is white, soft and light, but fibrous and tough. It weighs about 19 lb. per cubic foot. It is used extensively for scabbards, sieve-frames, jars for household purposes, and occasionally for planking. A good cordage fibre of a pale straw colour is obtained from the bark. The wood, ash and bark are employed for dyeing, and the bark is also used in medicine (Haines).

Two varieties are sometimes distinguished.

Var. *glabrescens* Prain.

The leaflets are as in type, but almost hairless beneath at an early stage. It can be distinguished from *E. stricta* by the areoles of the leaves being less conspicuous and not white.

Distribution.—Hot valleys of the West Himalaya from Bashahr (up to 7,000 ft.) eastward to Sikkim, also in Burma and on the Shan Hills.

Var. *sublobata* Baker.

The leaflets are variously lobed or notched, very hairy beneath.

Flowers.—At the end of the cold season. Seed ripens before the rains begin.

Distribution.—Parasnath, Hazaribagh, Monghyr, inland mountains in the Circars.

Popular names.—Almora : Rungra ; *Berar* : Pangra ; *Bhil* : Sambar ; *Bombay* : Pangara, Pangra ; *Burma* : Kathit ; *Canarese* : Kaduparivala, Mulluhalivara, Mulluhongara ; *Deccan* : Pangara ; *English* : Corky Coral Tree ; *Garo* : Mandal ; *Gond* : Baldia, Phangera ; *Gujerati* : Jagriyokhakharo, Jangariokhakhro, Janghario ; *Hindi* : Dauldhak, Dhauldhak, Madar, Madara, Nasut, Pangara, Pangra ; *Melghat* : Nagthada, Nangthoda ; *Nepal* : Phullidha ; *Nimar* : Gadha palas ; *Oudh* : Nasut ; *Punjab* : Gulnashtar, Pariara, Thab ; *Tamil* : Mullumurukku, Munmurukku, Murukku, Vellaikkaliyanamurukku ; *Telugu* : Barijama, Barjapu, Mullumoduga, Munimoduga, Rohi, Rohitakamu ; *Uriya* : Bonopalodhua, Chaldua, Mushkombhu, Paldua, Salotonya.

6. Erythrina arborescens Roxb.

A low tree. Trunk straight, with no more than two or three simple ascending branches, armed with a few, scattered, small, sharp prickles, otherwise smooth in every part. Leaflets entire, smooth above, whitish underneath, the end one nearly kidney-shaped. Flowers many, large, of a vivid scarlet, in threes, stalked, drooping over each other in an elegant way. Calyx entire, bell-shaped, coloured. Standard almost egg-shaped, boat-shaped, hanging over the rest of the flower. Pod much curved, $\frac{1}{2}$ to $\frac{3}{4}$ ft. long, 1 in. or more broad, 4 to 6 seeded.

The flowers resemble those of *E. suberosa*, but the calyx is larger and the limb of the standard broader.

Flowers.—August to October.—The flowers appear together with the leaves.

Distribution.—Outer Himalaya from the Ganges to Sikkim at elevations between 4,000 and 7,000 ft., Melghat Berar, Khasia Hills. Occasionally planted in Sind and elsewhere.

The wood is similar to that of *E. suberosa* and *E. indica*, but is more compact, less spongy, and has more numerous concentric bands of soft texture.

Popular names.—Khasia : Dingsong ; *Kumaon* : Mandiara, Rungara ; *Lepcha* : Gyesa ; *Nepalese* : Phullidha, Rodinga.

7. Erythrina subumbrans Merr.

A tall tree, reaching a height of 45 ft., without or with a few straight sharp prickles. Leaflets membranous, dark-green, egg-shaped, long-pointed, 4 to 6 in. long. Racemes of flowers appearing with the leaves, hairy, about 4 in. long. Calyx velvety, finally splitting down nearly to the base in two lips. Petals red, the standard about 1½ in. long, keel and wings less than half the length of the standard. Pod much bent back, 4 to 5 in. long, flat, seedless in the lower half, bearing 1 to 3 seeds at the tip.

Flowers.—January, February.

Distribution.—Burma, in moist valleys near streams up to 3,000 ft., Indo-China and Malaya.

Uses.—Often grown to support the betel-vine.

"This tree is universally employed in the Java plantations as a shade tree for coffee, and, with *E. umbrosa*, H. B. K. from Central America and *E. velutina*, Willd. from the W. Indies, is used for the same purpose over cocoa in Ceylon" (Gamble).

This thornless evergreen tree is known in Burma as "yekathit." It is very ornamental while in flower, during the rainy season. It is easily raised from seed.

8. Erythrina resupinata Roxb.

Though the species is not a tree, but a herb or undershrub, we include it here, because it is one of the curious dwarf representatives of otherwise tree-producing genera. Similar instances occur in *Ochna*, *Grewia*, *Combretum*, *Careya* and *Premna*. Gamble is of opinion that they "have become definite species through years of regular burning of the above-ground stems."

Description.—An undershrub with a perennial rootstock. Shoots a few inches high, dying down annually. Leaf-stalks long, prickly; Leaflets 2 to 3 in. long and broad, round-heart-shaped, entire, nerves beneath sometimes prickly. Racemes direct from the rootstock, under 1 ft. high, dense and many-flowered, often appearing before the leaves; stalk prickly. Flowers bright scarlet, large, in threes. Calyx 2-lipped, bell-shaped. Standard oblong, 3 to 4 times the length of the calyx, keel half as long as the standard, tinged with red; wings much shorter, greenish. Upper stamen free from low down. Pods stalked, about 3 in. long, flat, 3-seeded, constricted between the seeds.

Flowers.—The flowers are produced in March after the fires of the hot season, and present a very beautiful appearance. After the flowers appears a short herbaceous stem which withers after the rains.

Distribution.—Savannahs of the subhimalayan tract from Oudh and Gorakhpur eastward, also on Parasnath.

Introduced Species.

Erythrina crista-galli Linn.

Bushy and woody, sometimes developing a very short trunk, but the flowering branches dying back after blooming, the stronger branches arising annually or periodically from near the root. Stem and leaf-stalks somewhat spiny. Leaflets egg-shaped oblong or lance-oblong, long-pointed, entire. Flowers large, brilliant crimson ; keel nearly as long as the down-folding standard ; wings rudimentary.

This plant runs into many forms, varying in the shade of red, some of them with variegated leaves.

It is a native of Brazil and has been introduced into Indian gardens.

According to Woodrow it thrives in any fair garden soil in the dry districts, and is easily propagated by cuttings.

Plants, when in flower, do not seem to merit the high praise bestowed upon them by their admirers. The rather dull-crimson flowers are not nearly so fine in colour as some of the foregoing ; though they look more ornamental, from the plant being in full leaf at the time.

Erythrina Blakei Hort.

A small tree or large shrub ; bole thick and crooked ; branches massive, spreading ; bark grey, smooth ; prickles very few. Leaflets round or egg-shaped, long-pointed, hairless, 3 to 4 in. long. Racemes terminal, leafy below with distant flowers, densely flowered above. Calyx bell-shaped, slightly 2-lipped, hairless. Corolla dark scarlet, 2 in. long ; standard $\frac{4}{5}$ in. broad ; keel less than half as long as the standard ; wings narrow-oblong, as long as the keel or nearly so.

Parker says that this plant is cultivated in gardens all over Northern India under the name given above. He thinks it might be a hybrid or form of the American *E. herbacea* Linn.

It is a rare plant, considered the most beautiful of the genus, bearing in April flowers of the most brilliant scarlet colour.

B. Legumes.

The popular name given to the important group of plants included in the general Order Leguminosae comprises the herbs, shrubs, vines, and trees of the mimosa family—*Mimosaceae*, the Senna family—*Caesalpiniaceae*, the Krameria family—*Krameriaceae*, and the Pea family—*Papilionaceae*. This order is a large one, and the plants occur in all parts of the world, but are abundant in tropical countries.

The trees of the Sub-Order *Papilionaceae* have frequently beautiful flowers, as in *Erythrina*, *Butea* and *Gliricidia*.

Flowers of the Brilliant Gardenia (*Gardenia lucida* Roxb.).

Photos by C. McCann.

Tree of the Brilliant Gardenia (*Gardenia lucida* Roxb.).

John Bale Sons & Danielsson, Ltd London.

THE BRILLIANT GARDENIA.

Gardenia lucida, Roxb.

(about ½ nat. size)

of resin which frequently forms globules at the
are from 2½ to 8 in. long by 1 to 3 in. broad. They
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the leaf is narrowed into the short leaf-stalk. The
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The Brilliant Gardenia

Gardenia lucida, Roxb

(about ½ nat size)

THE BRILLIANT GARDENIA.

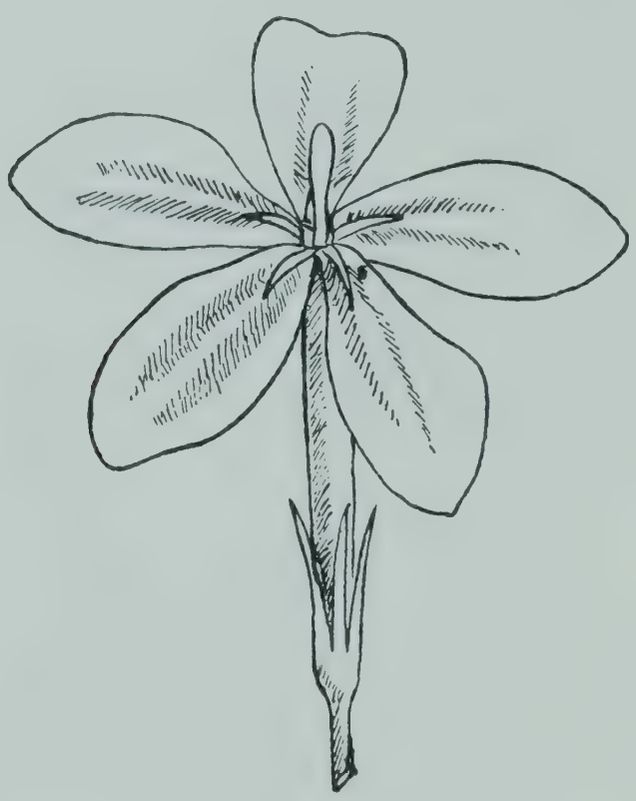
GARDENIA LUCIDA Roxb.

Belongs to the family Rubiaceae. *Gardenia* was named so after Alexander Garden, M.D., of Charleston, S.C., a correspondent of Linnaeus ; *lucida* means shining, brilliant.

Description.—A large smooth shrub or small tree reaching 20 to 25 ft. in height. The bark is smooth and grey, when young greyish-green. Shoots are smooth and shining and covered with a thin

yellowish coating of resin which frequently forms globules at the tips. The leaves are from 2½ to 8 in. long by 1 to 3 in. broad. They are elliptic-oblong in outline, with partially blunt or fine pointed tips. The base of the leaf is narrowed into the short leaf-stalk. The slender main nerves of the leaf are prominent on the underside. The stipules between the opposite leaves are large, broadly egg-shaped, pointed and thin in texture. The flowers are large and fragrant. They rise singly in the axils of the uppermost leaves near the extremities of the branches ; the flower stalks vary from ¼ to ½ in. in length. The calyx is ¾ in. long and softly hairy, the teeth are ⅜ in. long, erect, lance-shaped and tapering to a fine point. The corolla is large, pure white on opening, soon turning yellow, the

tube is $1\frac{1}{4}$ to 2 in. longer, slender, covered with fine hairs on the outside. The five petals are obovate, blunt, $1\frac{1}{4}$ to $\frac{3}{4}$ in., spreading, veined and smooth. The fruit is elliptical or rounded in outline, $\frac{3}{4}$ to 1 in. in diameter, smooth, marked with longitudinal lines and



crowned by the persistent calyx, the outside is thick and woody. The flowers open in the evening, soon turn from white to yellow and die (Cooke).

Distribution.—Growing wild in Burma, Chittagong, from the Konkan southwards, North Kanara, Deccan and Carnatic, in deciduous forests in all the dry districts of the Madras Presidency.

Economic value.—The remarkable gum-resin, *dikamali*, or *cumbi*-gum, is obtained from this species and from *G. gummifera* Linn. f. The exudation from both species is apparently identical, and in both cases forms transparent tears from the extremities of the young shoots and buds. These shoots and buds are broken off with the drops of gum-resin attached, and exposed for sale either in this form, or after agglutination into cakes or irregular masses.

Commercial *Dikamali* is sold either in the form of the twigs coated with and agglutinated by the gum-resin, or as irregular earthy-looking masses, of a dull olive-green colour which consist of the resin more or less mixed with bark, sticks, and other impurities. It has a peculiar and offensive odour like that of cat's urine. When carefully collected and free from impurity it is transparent and of a bright yellow colour.

The wood is yellowish white, close-grained, hard, containing no heartwood, weight 39 lb. per cubic foot. It is useful for turning, and is employed for making combs by the Natives.

Domestic uses.—The fruit is an article of food in the Central Provinces.

Medicinal properties and uses.—Ainslie in his *Materia Indica* writes : "Cumbi-pisin or cumbi-gum is a strong-smelling gum-resin, not unlike myrrh in appearance, and possessing, the Hakims say, nearly similar virtues ; it is, however, far more active, and ought, on that account, to be administered in very small doses ; as an external application, it is employed, dissolved in spirits, for cleaning foul ulcers, and, where the balsam of Peru cannot be obtained, might be used as a substitute for arresting the progress of sphacelous and phagedenic affections, which that medicine has the power of doing (at least in hot climates) in a very wonderful manner." The drug is considered anti-spasmodic, carminative, and when applied externally, antiseptic and stimulating. It is accordingly employed by the Natives of Southern and Western India, in cases of hysteria, flatulent dyspepsia, and nervous disorders due to dentition in children, also externally as an application to foul and callous ulcers, and extensively to keep away flies from sores. It has also been employed in European practice for the last purpose with marked success, both in hospitals and in veterinary work, and is said to be a successful anthelmintic in cases of round worm (Watt).

"The gum of the tree melted in oil is applied to the forehead to check headache" (V. Ummegudien, Madras).

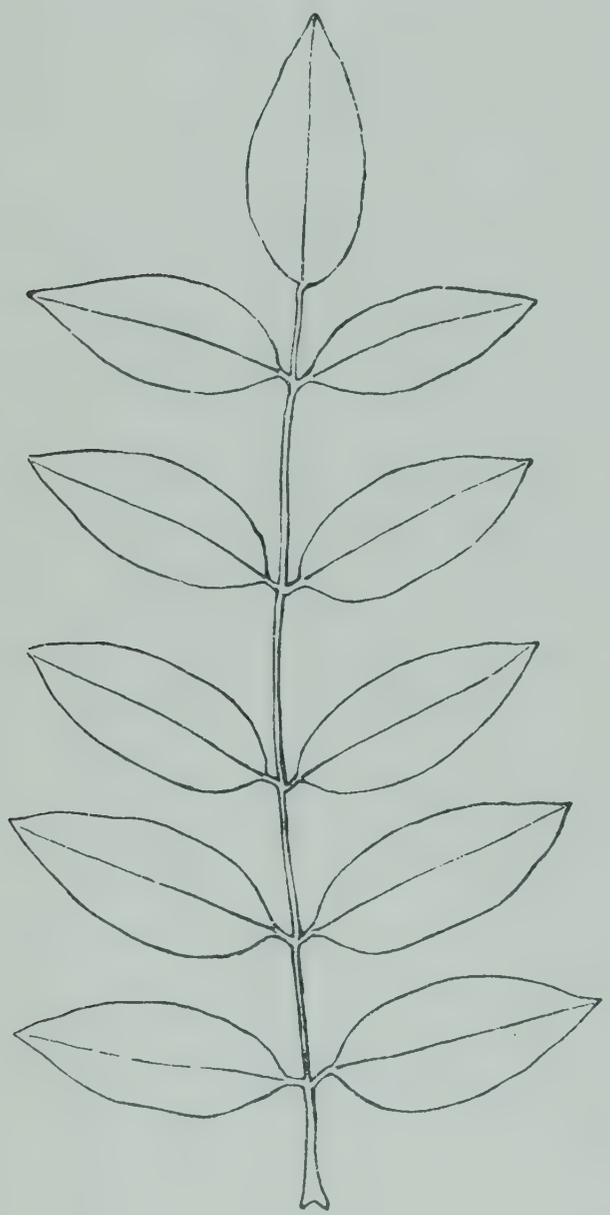
Gardening.—For sowing it is preferable to separate the numerous seeds, though in nature a whole fruit will rot and the seeds germinate in a heap. The seedlings do best in partial shade (Haines). It can also be propagated by cuttings in the rains.

Popular names.—*Berar* : Dikamali ; *Bijeragogarh* : Papar ; *Bombay* : Dekamali ; *Canarese* : Bikke, Dikkamalli ; *Central Provinces* : Kokkita, Kondamanga, Kuru, Tettamanga ; *English* : White Emetic Nut ; *Gujerati* : Dekamari, Dikamali ; *Hindi* : Dekamali, Dekamari, Dikamali ; *Kathiawar* : Malan, Malati ; *Konkani* : Dikamali ; *Koya* : Karangi ; *Marathi* : Dekamari, Dikamali ; *Porebunder* : Bhaladi, Bhalan ; *Sanskrit* : Hingu, Hingunadika, Jantuka, Nadihingu, Palashakhya, Pinda, Pindavha, Ramathi, Shivadika, Suvirya, Vanshapatri, Venupatri ; *Tamil* : Kambil, Kumbai, Tikkamalli ; *Telugu* : Bikki, Erubikki, Karinguva, Sinnakaringuva, Tellakaringuva, Yettabikki ; *Tulu* : Dikkamalli.

THE SPOTTED GLIRICIDIA.

GLIRICIDIA MACULATA H.B. & K.

The generic name *Gliricidia* means "rat-destroying" in reference to the seeds which are believed to be effective as rat poison ; *maculata*, meaning spotted—describes a character of the undersurface of the leaves.



Description.—A small elegant and quick growing tree with arching branches and feathery foliage somewhat reminiscent of the Cassias.

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THE SPOTTED GLIRICIDIA.

Gliricidia maculata H B & K.

(about ½ nat size)

THE SPOTTED GLIRICIDIA.

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Description.—A small elegant and quick growing tree with soft pinnate leaves and feathery foliage somewhat resembling that of the Tamarind

THE SPOTTED GLIRICIDIA.

Gliricidia maculata, H.B & K.

(about ½ nat. size).

Flowers of the Spotted Gliricidia (*Gliricidia maculata*).

Spotted Gliricidia Tree in the Victoria Gardens, Bombay.

The leaf is described as odd pinate, the leaf-stalk bearing 8 pairs of pinnae or leaflets and with an odd terminal leaflet. The leaflets are oblong in shape, blunt at the apex, covered with a mat of fine hairs above and dull green below, the black spotting on the undersurface of the leaves gives the tree its specific name. The tree sheds almost all its leaves during the cold weather when it flowers.

It is strikingly beautiful in bloom when its branches for the greater part of their length are covered with masses of pinkish purple or pale pink flowers. The flowers grow in clusters. The calyx of the flower is lobed—the petals consist of a large erect backward-curving standard petal, 2 sickle-shaped wing-petals and an incurving keel-petal. The two-valved pod is long and flat with a thickened margin.

Flowering season.—In Bombay these trees usually flower in February and March.

Gardening.—The Spotted Gliricidia is easily raised from seed or cuttings which should be 5 to 6 ft. long and planted 12 ft. or more apart. The tree bears such a heavy crop of leaves that the branches are frequently broken by the wind, especially as the wood is very brittle, and it is better to pollard the tree from time to time.

Uses.—Macmillan states that the rapid growth of the tree and its long leafy branches recommend it as a useful shade tree for crops and for green manuring. The whole tree is rich in nitrogen, the flowers alone containing up to 3·36 per cent. The dried leaves smell like new-mown hay.

Distribution.—Guatemala to South America. It was introduced into Ceylon from the West Indies about 1899. At a meeting of the members of the Bombay Natural History Society held on September 29, 1916, Mr. Millard exhibited a young specimen of this handsome flowering tree which he had raised from seed received from the Peradeniya Gardens through the kindness of Mr. Macmillan, the Curator, and this was probably the first introduction of this tree into Bombay.

It is grown as a permanent shade tree for Cacao in Nicaragua, Trinidad, the West Indian Islands, and many parts of the tropics. It is cultivated in Old Calabar streets as a shade tree.

Botanical name.—Under the International Rules of Nomenclature the name of this species should be *Gliricidia sepium* (Jacq.) Kunth in Steudel Nomenclatur Botanicus, ed. 2. I. 688. 1840.

Sepium is derived from *sepes*—a hedge.

Popular names.—*English* : Madre of Cocoa, Madura Shade Tree, Mother of Cocoa, Nicaraguan Shade Tree ; *Nicaragua* : Madera, Madura.

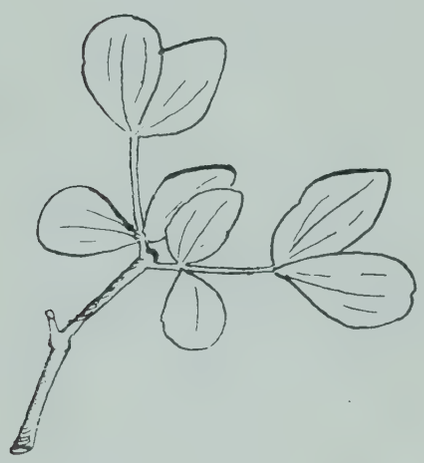
THE LIGNUM VITAE TREE.

GUAIACUM OFFICINALE Linn.

The generic name is derived from the Spanish one, *guayacan* or *guayaco*, which itself originated from *hoaxacan*, the Mexican appellation of the plant.

The specific name *officinale* means "officinal," "used of medicinal or other plants procurable at shops"; or "used or recognized in pharmacy or medicine."

Description.—The Lignum Vitae Tree grows to a height of 30 to 40 ft. The stem is generally crooked, the wood intensely hard, the branches knotty and the bark deeply furrowed.



The dense crown of close-growing foliage gives the tree a rounded, compact, neat appearance. It is distinctly ornamental on a lawn. Each leaf is composed of two or three pairs of smooth, stalkless, leaflets arranged on a slender mid-rib. The leaflets are $\frac{1}{4}$ to $\frac{1}{2}$ in. in length. There is much irregularity both in their size and shape: some are rounded at the apex (obovate), others almost blunt (obtuse).

The tree flowers at the end of the cold season and the commencement of the hot weather. In Bombay some of the trees are in bloom the whole year round. The beautiful blue flowers grow in great profusion. They almost cover the tree. The flowers remain for a long time. As the older blooms fade from deep blue to paler shades, some becoming almost white, a striking variegation of colour is produced. The flowers grow in clusters at the end of the branches. Each flower has five petals cupped in a small, finely hairy calyx,

LIGNUM VITAE TREE.
Guaiacum officinale, Linn.
(about 2/3 nat. size)

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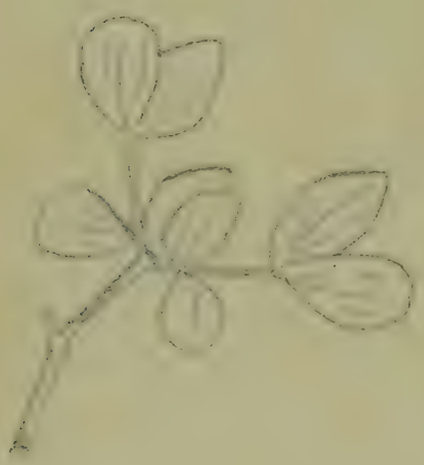

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LIGNUM VITAE TREE.
Guaiacum officinale, Linn.
(about 2/3 nat. size)

The Lignum Vitae Tree (*Guaiacum officinale*).

Photos by C. McCann.

Flowers of the Lignum Vitae Tree (*Guaiacum officinale*).

supported on a slender stalk. There are ten stamens bearing golden yellow anthers.

The fruit appears as small, round, compressed yellow capsules, containing 5 cells ; occasionally there are fewer. Each cell encloses a single seed.

Distribution.—The Lignum Vitae Tree is an inhabitant of the islands of the West Indies, from whence it was introduced into India. It also grows in the arid plains stretching from the Florida Keys to Venezuela.

Gardening.—Raised from seed. For many years we knew of only one tree in Bombay which was growing in the compound of the Jamsetjee Jejeebhoy Hospital. This had been introduced, we were told, by Dr. Wellington Gray, from the West Indies. Seeds were obtained from this tree by the late Mr. H. V. Kemball and now it is a fairly common tree in gardens in Bombay. It succeeds well at Madras and Bangalore, though at the latter station it is rare and somewhat stunted in growth.

Uses.—The wood, called Lignum Vitae (Pockholz or Franzosenholz by the Germans) reached Europe *via* Spain probably towards the end of the fifteenth century. Soon it became famous as a remedy against the " Morbus Gallicus," and was praised as such in numerous books of which the most important is : Ulrici de Hutten Eq., *De Guaiaci medicina et morbo gallico liber unus. Moguntiae* 1519.

The heart-wood is greenish-brown, the sapwood pale-yellow. It is remarkable for the direction of its fibres, each layer of which crosses the preceding diagonally. It sinks in water. It is of great value and is used for many purposes, chiefly by turners. Ship's blocks, rulers, pulleys, skittle-balls, bowls are among the articles made of it. When rubbed and heated, it gives off a faint, disagreeable aromatic odour. Its taste is pungent and aromatic. Shavings and raspings of the wood are used by apothecaries for medicinal purposes. In the same way the bark is employed in medicine. The most important product is a resin obtained from the wood and bark, and used in powder, pill and tincture. It is an acrid stimulant and has been found efficient against various diseases. The resin is an ingredient of the well-known Plummer's Pills. It is also one of the chief means employed to detect blood-stains.

The resin sometimes flows spontaneously from the stem of the tree ; at other times, it is obtained artificially by jagging or notching the stem and allowing the exuding juice to harden, or by boring holes in logs of the wood and then placing them on a fire so that the resin is melted and runs through the hole, or by boiling the chips in salt and water, when the resin floats on the surface of the water.

The resin is greenish-brown in colour and has a brilliant resinous fracture. Of taste there is scarcely any, but it leaves a burning sensation in the mouth.

Popular names.—Danish : Frazostraee ; *Dutch* : Pokhout ; *English* : Guaiacum, Lignum Vitae Tree ; *French* : Bois saint, Gaïac, Gayac ; *German* : Franzosenholz, Guayakholz, Pockenholz ; *Italian* : Guajaco, Legno guajacano, Legno santo ; *Portuguese* : Guyaiaco ; *Russian* : Bakaut ; *Spanish* : Guayacan, Guayaco, Leño santo, Palo santo, Palo santo de las Indias ; *Swedish* : Fransosenholts.

A. Guaiacum Plum.

The genus contains 10 species of trees or shrubs, all indigenous to Tropical America. They are noted for the resin which they secrete, and the extreme hardness of their wood.

B. Zygophyllaceae.

The family name is derived from the Greek and alludes to the numerous pairs of leaflets, *zygon* = yoke + *phyllon* = leaf. The family consists of 22 genera and about 160 species, mostly natives of the warm regions in the northern hemisphere ; they principally inhabit the extra-tropical and hot regions of both hemispheres, especially abounding from the north-west of Africa, through the Mediterranean region, to the northern limit of India ; they are rarer in South Africa, Australia and South America.

Photos by *C. McCann.*

The Mimosa-leafed Jacaranda
(*Jacaranda mimosaefolia* D. Don.).

A spray of flowers of the Mimosa-leafed Jacaranda
(*Jacaranda mimosaefolia* D. Don.).

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THE MIMOSA-LEAFED JACARANDA.

Jacaranda mimosaefolia, D. Don.

(about ½ nat. size)

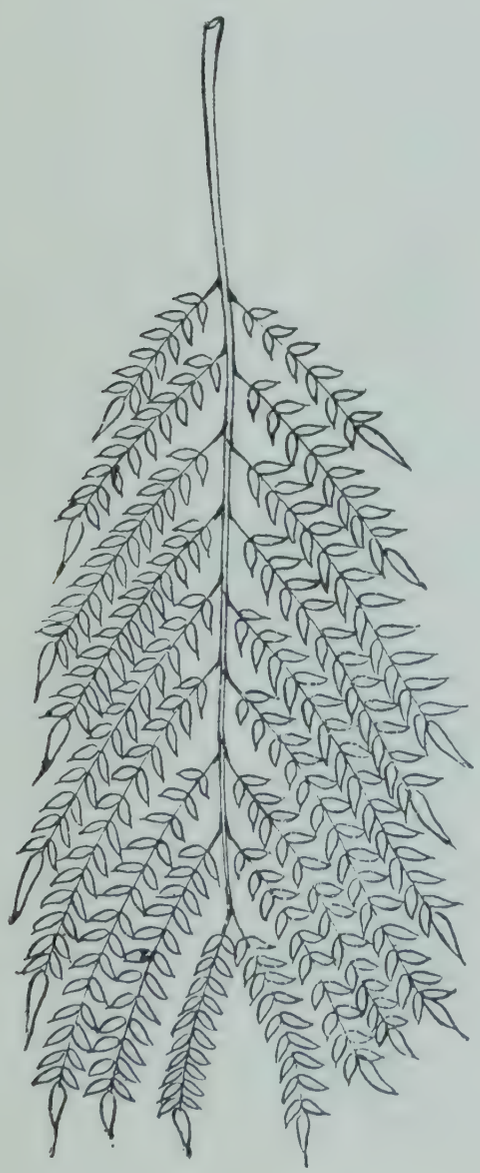
the calyx longer. The plant bears long, pyramidal panicles, 8 in. high, of 80 to 90 blue flowers, each 2 in. long and 1½ in. wide, which have a long, bent, swelling tube and the 2 lobes of 1 lip smaller than the 3 other lobes. Calyx small, 5-toothed (or in other words : Corolla 2 in. long, the tube slender and curved below, inflated above,

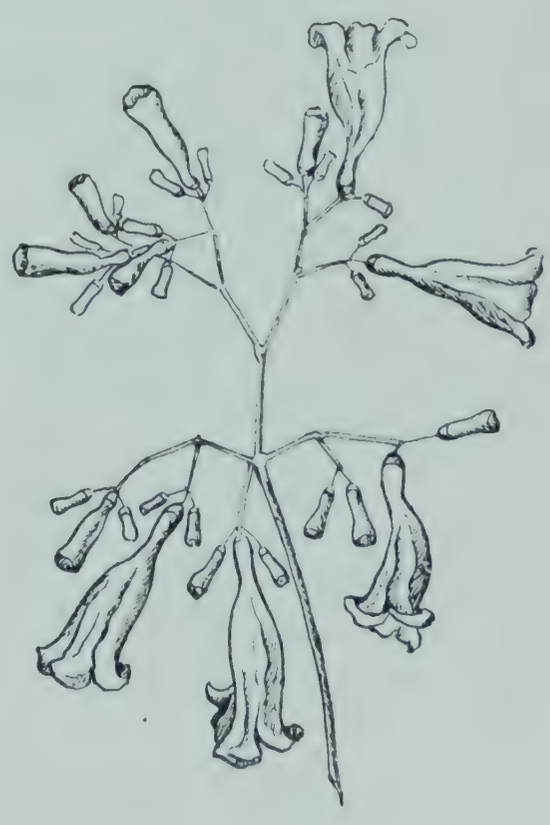
The Mimosa-leafed Jacaranda
Jacaranda mimosaefolia, D. Don.
(about ½ nat. size)

THE MIMOSA-LEAFED JACARANDA.

JACARANDA MIMOSAEFOLIA D. Don.

Description.—A tree, 50 ft. and more. The foliage is as finely cut as a fern, symmetrical and elegant. The leaves are opposite, distant, each one with 16 or more pairs of pinnae, each pinna having 14 to 24 pairs of leaflets ; leaflets oblong-rhomboid, $\frac{1}{5}$ to $\frac{1}{3}$ in. long,





the end-one larger. The plant bears loose, pyramidal panicles, 8 in. high, of 40 to 90 blue flowers, each 2 in. long and $1\frac{1}{2}$ in. wide, which have a long, bent, swelling tube and the 2 lobes of 1 lip smaller than the 3 other lobes. Calyx small, 5-toothed (or in other words : Corolla 2 in. long, the tube slender and curved below, inflated above,

the limb 2-lipped, one lip 2-lobed, the other 3-lobed). Perfect stamens 4, 2 long and 2 short ; barren stamen (staminode) about as long as the stamens, club-shaped at the tip. Fruit an oblong, ovate or broad dehiscent capsule.

A very beautiful tree with foliage resembling that of the Albizzias or Mimosas. It perhaps ranks among the best flowering trees or shrubs for subtropical and tropical regions.

It is a native of Brazil and of somewhat recent introduction, but now becoming common in gardens.

This tree is not common round Bombay and although it does sometimes flower there, the temperature, or perhaps the sea air does not appear to suit it so well as up-country. At Pachmarhi, C.P., this tree thrives and flowers splendidly as also in Northern India.

The flowers are violet-blue in colour at first, but the colour varies according to the number of days they have been out and other conditions, some flowers being almost mauve. The tree flowers in March and also at other times.

Gardening.—Propagated by cuttings of half-ripened wood. It stands pruning well and can be kept in regular form.

Uses.—It makes a useful avenue tree.

The plant is used medicinally in Colombia : an infusion of the leaves is taken as a pectoral ; the powdered leaves are used as a vulnerary ; an infusion of the bark is used as a lotion to wash ulcers ; the bark and the leaves are given internally for syphilis and blennorrhagia.

Popular names.—Brazil : Jacaranda ; *Colombia* : Gualanolay ; *Gold Coast* : Blue Jacaranda.

Tree of *Kleinhovia Hospita* in the Agri-Horticultural Society's Gardens, Madras.

Flowers of *Kleinhovia Hospita*. The Agri-Horticultural Society's Gardens, Madras. September 21st, 1935.

John Bale Sons & Danielsson Ltd London.

THE KLEINHOVIA TREE.

Kleinhovia Hospita, Linn.

(about ½ nat. size)

THE KLEINHOVIA

[illegible]

[illegible]

In regard to the derivation [illegible] of Mr. C. A. Backer of [illegible], we quote the following :—

"Linnaeus correspondent was Christiaan Kleynhoff, born (year unknown) at Sandau in Upper Silesia, who was a Government physician for three years in West India and for twenty-one years in East India and, from 1741 or 1742, a civil officer of the V.O.I.C. (United East India Company). He had a garden at Batavia in which many native and Chinese medicinal plants were grown. He returned to Holland in 1763 and died at Culemborg, Holland, in 1777."

Mr. Wm. T. Stearn, Librarian, Lindley Library, Royal Horticultural Society, London, has kindly supplied the following note on the specific name *Hospita* :—

"*Hospita* is the feminine of *hospes*—a visitor, guest or stranger. Bonnaire's account of Kleynhoff's generosity in distributing plants and seeds suggests that the specific name (*Hospita*) refers not to a property of the plant *Kleinhovia* itself but to the hospitable Kleynhoff himself. The capital H for *Hospita* is I presume used by Linnaeus because *Hospita* is here a noun in apposition, not an adjective in agreement, in the same way as Linnaeus adopted a capital letter for generic or vernacular names used as a specific epithet, e.g. *Epidendrum*, *Vanilla*, *Schinus Molle*, etc."

This is a moderately sized tree with large leaves and showy panicles of delicate rose pink flowers. The leaf is oval often with a heart-shaped base. Its nerves 3 to 7 in number grow out fan-wise from the base. The small flowers grow in large many-branched clusters. The fine sepals of the flower fall off early leaving only the pink unequal petals the uppermost of which has a long claw-shaped apex. The stamens unite to form a slender column, which widens into a cup, bearing in each of its five divisions three 2-celled anthers. The ovary is 5-celled and lobed and lies in the cup formed by the stamens. The style is slender, the stigma divided into five parts. The fruit is a membranous inflated capsule. The seeds are marked with small tubercles.

Flowering season.—July to August ; March and September in the Philippine Islands.

Distribution.—The tree is indigenous to the delta of the Mekong

THE KLEINHOVIA TREE

Kleinhovia · Hospita, Linn.

(about ½ nat. size)

THE KLEINHOVIA.

Kleinhovia Hospita Linn.

Kleinhovia Hospita was described first in Linnaeus' *Sp. Plantarum*, Ed. 2, as "*Kleinhof horti Bot. cultor in Java.*" Nairne (*Flowering Plants of Western India*) says: "A doubtful native (D) but pretty widely distributed in India (H)."

In regard to the derivation of the name *Kleinhovia*, by the courtesy of Mr. C. A. Backer of Heemstede, formerly botanist at Buitenzorg, we quote the following :—

"Linnaeus' correspondent was Christiaan Kleynhoff, born (year unknown) at Sandau in Upper Silesia, who was a Government physician for three years in West India and for twenty-one years in East India and, from 1741 or 1742, a civil officer of the V.O.I.C. (United East India Company). He had a garden at Batavia in which many native and Chinese medicinal plants were grown. He returned to Holland in 1763 and died at Culemborg, Holland, in 1777."

Mr. Wm. T. Stearn, Librarian, Lindley Library, Royal Horticultural Society, London, has kindly supplied the following note on the specific name *Hospita* :—

"*Hospita* is the feminine of *hospes*—a visitor, guest or stranger. Burmann's account of Kleynhoff's generosity in distributing plants and seeds suggests that the specific name (*Hospita*) refers not to a property of the plant *Kleinhovia* itself but to the hospitable Kleynhoff himself. The capital H for *Hospita* is I presume used by Linnaeus because *Hospita* is here a noun in apposition, not an adjective in agreement, in the same way as Linnaeus adopted a capital letter for generic or vernacular names used as a specific epithet, e.g. *Epidendrum*, *Vanilla*, *Schinus Molle*, etc."

This is a moderately sized tree with large leaves and showy panicles of delicate rose pink flowers. The leaf is oval often with a heart-shaped base. Its nerves 3 to 7 in number grow out fan-wise from the base. The small flowers grow in large many-branched clusters. The fine sepals of the flower fall off early leaving only the pink unequal petals the uppermost of which has a long claw-shaped apex. The stamens unite to form a slender column, which widens into a cup, bearing in each of its five divisions three 2-celled anthers. The ovary is 5-celled and lobed and lies in the cup formed by the stamens. The style is slender, the stigma divided into five parts. The fruit is a membranous inflated capsule. The seeds are marked with small tubercles.

Flowering season.—July to August ; March and September in the Philippine Islands.

Distribution.—The tree is indigenous to the delta of the Mekong

River. It is common on the shores of the Malay Archipelago and grows inland in Tropical East Africa and Australia. It was introduced into Ceylon about 1820 and is now fairly established in cultivation in Western India.

Gardening.—A beautiful tree particularly when in bloom and really worthy of cultivation. It is propagated by layers ; seeds being rarely procurable.

Uses.—Frequently grown as an avenue tree, especially in Calcutta and Poona.

The bark yields a strong bast fibre.

The shoots and tender leaves are eaten cooked in the Philippine Islands. In Cochin China a decoction of the leaves is used as a lotion to wash cutaneous eruptions and cure scabies.

The old timber is said to be highly valued in Java for handles of kreeses.

Vernacular names.—Cochin China : Tra ; *Ilocano* : Bignon, Bitang, Bitnog, Bitnon, Bitnong ; *Pampangan* : Pampar, Panampat ; *Tagalog* : Tanag ; *Tamil* : Panaitteku ; *Visayan* : Hamitanago, Tanag.

Photo by T. D. Srinivasan.

Roxburgh's Kydia (*Kydia calycina* Roxb.). Young tree. Royal Botanic Garden, Calcutta.

John Bale Sons & Danielsson Ltd London

ROXBURGH'S KYDIA.

Kydia calycina Roxb.

(about 2/3 nat. size).

densely close-haired beneath ; leaf-stalk 1 to 2 in. long. Panicles many flowered, covered with tawny short hairs, flower-stalk $\frac{3}{8}$ in. long. Below the calyx there is a series of 4 to 6 strongly nerved involucral bracts which enlarge and persist in fruit, $\frac{1}{4}$ to $\frac{3}{8}$ in. long. Corolla white or pink, petals reversedly heart-shaped, longer than the calyx, prolonged into a claw at the base with a tuft of hairs on outer side. The filaments are united to form a staminal tube for a little more than half their length then dividing into 5 spreading branches, each carrying 3 almost stalkless anthers. Style branches 3, each surmounted by a large disc-like stigma. Fruit 3-valved, about the size of a pea, covered with mealy dust, rounded with a slightly umbrella-shaped top. Seeds kidney-shaped, striated, brown-black.

Distribution —Common throughout India and Burma chiefly in mixed and deciduous forests not in arid regions.

ROXBURGH'S KYDIA.
Kydia calycina Roxb.
(about 2/3 nat. size).

ROXBURGH'S KYDIA.

KYDIA CALYCINA Roxb.

Belongs to the family *Malvaceae*. The genus is named after Colonel Robert Kyd, founder and first Director of the Royal Botanic Gardens, Calcutta, who died in 1794. The specific name is with reference to the prominent calyx.

Description.—A large shrub or small tree. Leaves 3 to 6 in. long, fanwisely 7-nerved, heart-shaped at the base, usually 3 to 7 lobed; lobes often angular, the median one the largest, smooth above,

densely close-haired beneath; leaf-stalk 1 to 2 in. long. Panicles many flowered, covered with tawny short hairs, flower-stalk $\frac{3}{8}$ in. long. Below the calyx there is a series of 4 to 6 strongly nerved involucral bracts which enlarge and persist in fruit, $\frac{1}{4}$ to $\frac{3}{8}$ in. long. Corolla white or pink, petals reversedly heart-shaped, longer than the calyx, prolonged into a claw at the base with a tuft of hairs on either side. The filaments are united to form a staminal tube for a little more than half their length then dividing into 5 spreading branches, each carrying 3 almost stalkless anthers. Style branches 3, each surmounted by a large disc-like stigma. Fruit 3-valved, about the size of a pea, covered with mealy dust, rounded with a slightly umbrella-shaped top. Seeds kidney-shaped, striated, brown-black.

Distribution.—Common throughout India and Burma chiefly in mixed and deciduous forests not in arid regions.

Gardening.—Propagated from seed. The seeds possess a comparatively low germinating power but this is compensated by the large number produced. The seeds should be sown in seed beds. and the seedlings transplanted when they are 2 to 3 in. high. The rate of growth is rapid and it has been estimated that the tree reaches its maximum growth at a comparatively early age, though the exact age has not been ascertained (Troup).

The leaves commence to fall at the end of November and the plant is leafless from January or early February to late April. The flowers appear in September-October, and the masses of greenish white or pale lilac blossoms make the tree a conspicuous sight at this season (Troup).

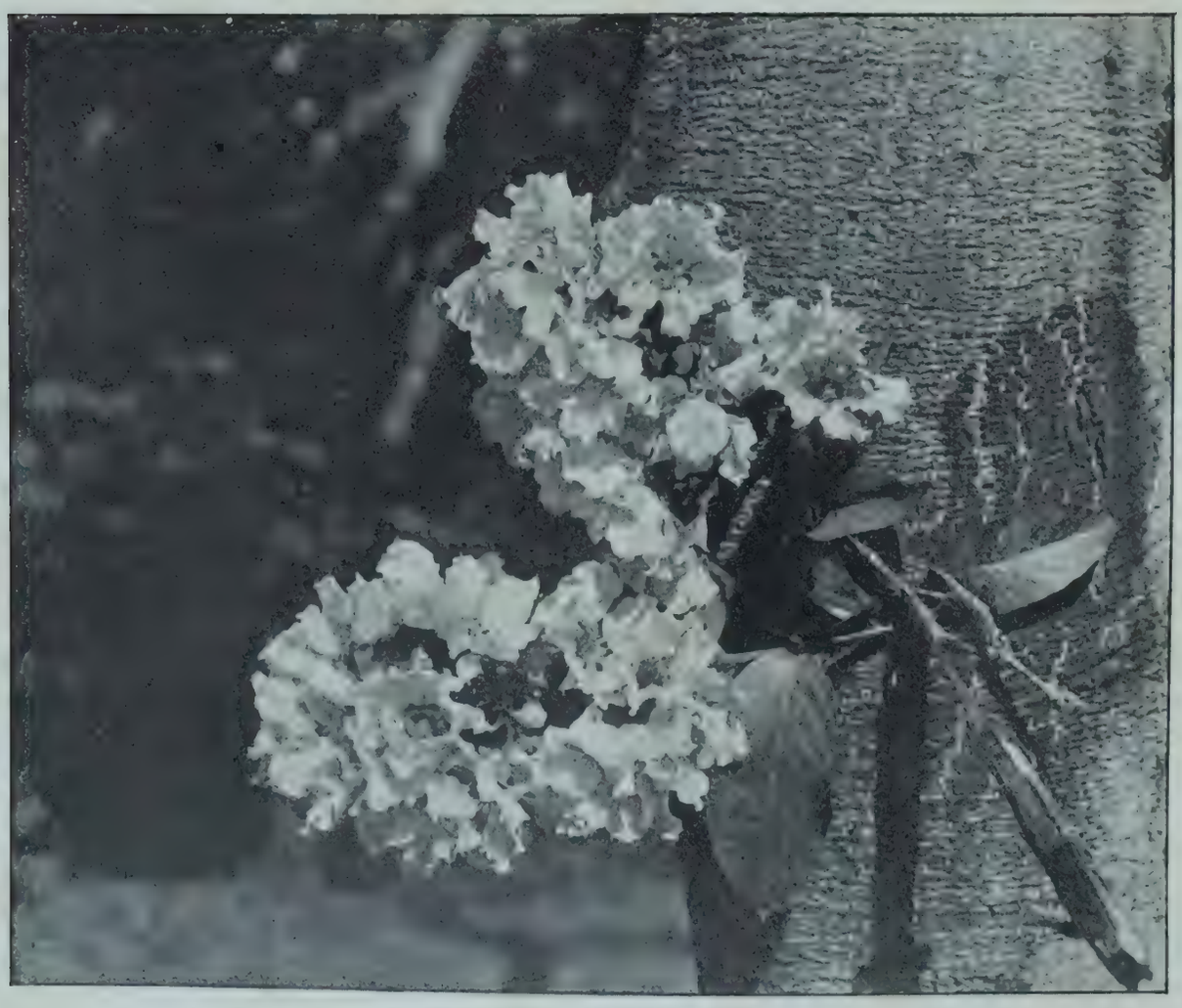
Economic value.—The inner bark yields a bast fibre used for coarse ropes. The young bark is used, on account of the quantity of its mucilage, to clarify sugar. It is a remarkable bark abounding in gum.

The wood is white, soft, with no heartwood, weighs 40 to 45 lb. a cubic foot ; used for house-building, ploughs, oars, spoons, for carving, and for charcoal and fuel.

The saplings are used, from their great strength and elasticity, for making banghy sticks.

Popular names.—Almora : Pata ; *Amraoti* : Bhoti ; *Bhil* : Bothi ; *Bijnor* : Palao, Pattra ; *Bombay* : Motipotari, Varanga, Varangada, Varung ; *Buldana* : Bhoti ; *Burma* : Bokemaiza, Dwabote, Dwalok, Myethlwa, Tabo ; *Canarese* : Belagu, Bellaka, Bende, Bendenaru, Bendi, Billulhendi, Kadubende, Kolibende, Nayibende ; *Central Provinces* : Baranga, Bargha, Bhotti ; *Garhwal* : Pillu, Pulao ; *Garo* : Boldobak ; *Gond* : Bosha, Burkapa, Buruk, Kunji ; *Gujerati* : Mhotihirwani, Nihotilirwani ; *Hasada* : Bitabororo ; *Hindi* : Baranga, Bargha, Choupultea, Patha, Pola, Potari, Pula, Puli, Pulipatha, Pulu ; *Kharwar* : Derki ; *Khond* : Wala ; *Kolami* : Bitagoinr, Bittia, Gonyer, Patadhamin ; *Konkani* : Varang ; *Lambadi* : Charpili ; *Lepcha* : Sedangtaglar, Ta-gla kung hlo-sa ; *Malayalam* : Velukku, Venta ; *Marathi* : Bhendi, Bhoti, Iliya, Potari, Varung ; *Matheran* : Bhoti, Potasi, Warung ; *Mechi* : Mahow, Moshungon ; *Melghat* : Bhoti ; *Nepal* : Kubinde ; *Nimar* : Safeddhaman ; *North-Western Provinces* : Puta, Puttiya ; *Oudh* : Kakahi ; *Porebunder* : Mhotihirwani ; *Punjab* : Pola, Pula, Pulli ; *Ramnagar* : Pula ; *Sadani* : Baranga, Bicra, Jhari ; *Santali* : Poshkaolat, Poskaolat ; *Saora* : Erukutada, Pulan ; *Shan* : Dwabok ; *Sinhalese* : Pulé ; *Tamil* : Vendai ; *Telugu* : Kondapotari, Pachabotuka, Pandiki, Peddakusiji, Peddapotari, Potari ; *Tharu* : Patar ; *Uriya* : Bankopasia, Bharimo, Khopashya.

The Queen's Flower Tree (*Lagerstroemia Flos Reginæ*), in flower in the Victoria Gardens, Bombay.



Flowers of the Queen's Flower Tree (*Lagerstroemia Flos Reginæ*).

Photos by C. McCann.

John Bale Sons & Danielsson, Ltd London.

THE QUEEN'S FLOWER.

Lagerstroemia flos reginae, Retz.

(about ½ nat. size).

most beautiful. The spreading panicles of the flowers rather remind one in shape of the white racemes of the Horse-Chestnut tree when in flower in England.

Description.—A moderate-sized tree but when growing on the banks of forest streams, it may reach a height of 60 ft. The trunk is straight. Its pale bark flakes off in irregular patches. The branches spread widely. The leaves grow on stout stalks; they are paler in colour below, oblong-lance shaped and bluntly pointed at the tips. A leaf measures 6 to 10 in. in length and 1½ to 3 in. in width. Its main nerves, there are from 10 to 13 upward curving pairs—are conspicuous and prominent. A network of fine veins covers both surfaces of the leaf.

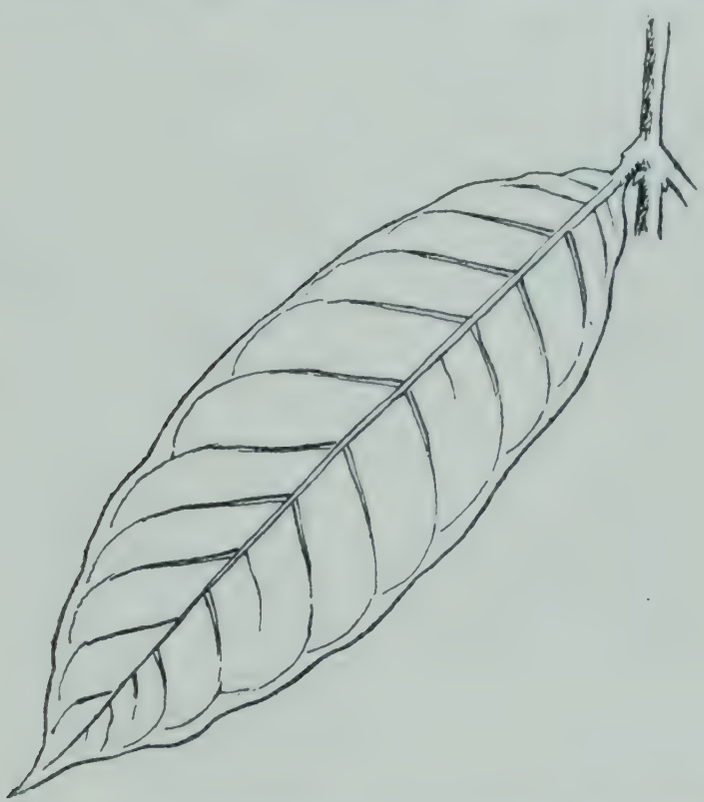
THE QUEEN'S FLOWER.
Lagerstroemia flos reginae. Retz.
(about ½ nat. size)

THE QUEEN'S FLOWER.

LAGERSTROEMIA FLOS REGINAE Retz.

After Magnus v. Lagerstroem, 1696-1750, a Swede and friend of Linnaeus ; *Flos-Reginae* means—flower of the Queen.

This tree does not grow to a large size in Bombay, about 20 ft. in height only, probably because Bombay is too far north for it to excel in growth, but it is a beautiful sight when in flower from May to July. There are various shades of colour in the flowers of these trees, some being purple and others different shades of mauve, approaching to pink, and these light pinkish mauve varieties are perhaps the



most beautiful. The upstanding panicles of the flowers rather remind one in shape of the white racemes of the Horse-Chestnut tree when in flower in England.

Description.—A moderate-sized tree but when growing on the banks of forest streams, it may reach a height of 60 ft. The trunk is straight. Its pale bark flakes off in irregular patches. The branches spread widely. The leaves grow on stout stalks ; they are paler in colour below, oblong-lance-shaped and bluntly pointed at the tips. A leaf measures 5 to 8 in. in length and 1½ to 3 in. in width. Its main nerves, there are from 10 to 13 upward curving pairs—are conspicuous and prominent. A network of fine veins covers both surfaces of the leaf.

The tree sheds its leaves during the cold weather when some of the leaves turn coppery red or yellow. But this leaf-fall is generally gradual. Few trees are absolutely bare. The young leaves come out with the blossoms in May. Then the tree covered with great clusters of large mauve flowers is a delight to the eye. Its massed flowers have not the aggressive beauty of the Gul Mohur or the Flame of the Forest but their soft pastel colouring is tenderly attractive and pleasing. Each cluster or panicle of flowers may be quite a foot in length springing from the branch as an upstanding spike, massed with flowers at its base and bearing numerous downy pink and green buds towards its tip. The earlier flowers at the bottom of the spike fade to a paler tone, thus varying the colours of the cluster from deep to palest mauve. The colouring of the flowers varies in different trees ; in some it is almost purple, in others mauve or pinky-mauve, while there is a beautiful variety in which the colours are bright pink. The calyx of the flower is green. It is covered with a white, sometimes reddish down. It has 6 or 7 sepals which are fused together and form a heavily ribbed cup with a lobed brim.

There are 6 or 7 petals, very crinkled and wavy, rounded at the apex and clawed or narrowing suddenly at the base. The stamens are all equal, shorter than the style, they are purplish red and bear yellow anthers. The tree fruits in great profusion and the fruits persist for a long time. Green fruits of the year are seen on the tree together with blackened fruits of the preceding season. They are globular in shape and contain smooth pale brown seeds.

Flowering season.—Flowers during the hot season and fruits during the rainy season. But young trees may be found in flower late in the rains.

Distribution.—W. Ghats of North Kanara and South Konkan through Malabar to Travancore, along the banks of nalas and rivers and in swampy localities, North Circars, Chota Nagpur, East Bengal, Assam, Burma, Malaya, China, Ceylon. Very often cultivated, especially so in the Gorakhpur district of the United Provinces.

Leaf-shedding, flowering and fruiting.—The tree sheds its leaves about February to March, the leaves turning reddish before falling ; the new leaves appear in April to May. The large terminal panicles of mauve flowers 2 to 3 in. in diameter, appear from April to June, at which time the trees are extremely handsome. The capsules 5-6-valved, broadly ovoid, $\frac{7}{10}$ to 1 in. long, ripen from November to January, according to locality, though they do not actually open and scatter the seeds for some little time. The seeds are light brown, angular, fairly hard, with a stiff, brittle wing, the whole $\frac{3}{5}$ to $\frac{7}{10}$ in. long ; they are often unfertile. The tree seeds at an early age ; vigorous plants raised from irrigated broadcast sowings at Dehra Dun commenced to bear seed at the age of three years.

Gardening.—" In full blossom in the morning the tree looks as if mantled with roses, but the flowers change through the day to a beautiful purple, making it appear at evening, if seen from a short distance, like a bower of English lilacs " (Hunter).

During the first season the growth of the seedling is slow, a height of only 2 to 6 in. being ordinarily attained by the end of the year ; subsequently the growth is considerably faster. Weeding and irrigation, particularly the former, greatly stimulate growth. Owing to the lightness of the seed and the small size of the young seedlings, direct sowings are less suitable than transplanting from the nursery.

Economic value.—The tree exudes a resin. The wood is of a light walnut colour, reddish or nearly white, tough and valuable under water, but not under ground ; used in India for boats, canoes, gun carriages, carts, wagons, ammunition box-boards, building, etc. ; in Ceylon for casks and various other purposes ; in Burma, where it is one of the most important timber trees, for somewhat similar purposes ; recommended for paving blocks ; weight per cubic foot, 41·77 lb.

In addition to its value for timber, the tree is everywhere admired for its beauty, and the main efforts seem to be centred in growing it under cultivation for ornamental purposes. This is the most valuable timber of Sylhet, Cachar and Chittagong and in Burma the next in value after teak.

Medicinal properties and uses.—The root is prescribed as an astringent. The root, bark, leaves and flowers are used medicinally by the Natives. It is stated that the seeds are narcotic, the bark and leaves purgative. The fruit is used in the Andamans as a local application for aphthae of the mouth.

Popular names.—*Assam* : Ajhar, Jarul ; *Bengal* : Jarul ; *Bombay* : Bondara Taman ; *Burma* : Eikmwe, Pyengma, Pyinma, Konepyinma ; *Canarese* : Challa Holedachalla, Holematti, Maruvachalla, Nirbendeka ; *English* : Queen's Flower, Queen of Flowers ; *Garo* : Bolashari ; *Hindi* : Arjuna, Jarul ; *Ho* : Garasekre ; *Kadir* : Semmaruta ; *Kolami* : Garasaikre ; *Konkani* : Tamonn ; *Magahi* : Kamaung ; *Malayalam* : Atampu, Chemmaruta, Katalpu, Manimarutu, Nirmarutu,

Nirventekku, Puvalventekku ; *Marathi* : Bondara, Motabondara, Taman, Tamana ; *Mundari* : Garasekere, Kuiri ; *Philippines* : Banaba ; *Sanskrit* : Arjuna ; *Santali* : Sekra ; *Sinhalese* : Murutagass, Murute ; *Tamil* : Kadali, Kadalimugai, Kadalippuva, Pumarudu ; *Telugu* : Varagogu ; *Tulu* : Challa ; *Uriya* : Ary, Jarulo, Patoli.

The Crêpe Myrtle.

Lagerstroemia indica Linn.

Another species of the same genus is widely grown in Indian gardens : The Crêpe Myrtle (*Lagerstroemia indica* Linn.) called Chinai-Mendhi. It is a native of China. It is one of the most beautiful shrubs in our gardens—grows to a height of 7 to 8 ft. The flowers hang in bunches at the extremity of the branches. The flowers are usually bright pink, but there are dark crimson, bluish, purplish and white forms. It flowers at the beginning of the rainy season. Easily propagated by cuttings or seeds.

It is widely spread throughout the Tropics and the warmer temperate regions of the globe.

The bark is considered stimulant and febrifuge.

In Indo-China the bark, leaves and flowers are said to be purgative, hydragogue, drastic.

Popular names.—Bengal : Phurush, Telingachina ; *Bombay* : Chinaimendhy, Dhayti ; *English* : Crape Myrtle, Crêpe Myrtle, Crêpe Plant, China Privet, Indian Lilac ; *Guam* : Melindres ; *Hindi* : Chinaimendhi, Farash, Phurush, Saoni, Telingachina ; *Indo-China* : Tuong vi bang lang se, Tu vi bach nhat hong ; *Manila* : Melindres ; *Mexico* : Astronomica ; *Tamil* : Pavalakkurinji, Sinappu, Tindiyam ; *Telugu* : Chinagoranta.

Indian Cork Trees (*Millingtonia hortensis*) on roadside in Bombay.

Photos by C. McCann.

Flowers of the Indian Cork Tree (*M. hortensis*).

INDIAN CORK-TREE.
Millingtonia hortensis, Linn. f.
(1/3 nat. size)

2 to 3 in. They are described as bi-pinnate or tri-pinnate, that is each leaf is composed of two to three pairs of pinnae or minor leaves arranged in pairs along the main rib. The pinnae bear smooth, oval

Though never completely bare, the Cork tree sheds a good proportion of its leaves between January and March and renews its foliage between April and May.

In Bombay and the Konkan, flowering commences about the end of October and continues right into December ; in other parts of Western India trees flower in August and September. Decked in

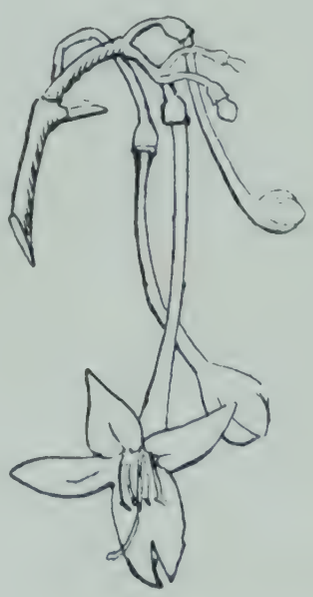
THE INDIAN CORK TREE.

MILLINGTONIA HORTENSIS Linn. fil.

The genus is named after Thomas Millington, English botanist of the eighteenth century. The specific name *hortensis* is Latin for "grown in gardens."

Description.—An elegant, straight tree reaching as much as 80 ft. in height, with drooping branchlets and a graceful elongate crown of deep green foliage. Its yellowish-grey bark is cracked and furrowed in various directions with corky fissures.

The foliage is very handsome. The leaves attain a length of 2 to 3 in. They are described as bi-pinnate or tri-pinnate, that is, each leaf is composed of two to three pairs of pinnae or minor leaves arranged in pairs along the main rib. The pinnae bear smooth, oval



or lance-shaped leaflets, 2 to 3 in. long. The young shoots are slightly hairy below. Though never completely bare, the Cork tree sheds a good proportion of its leaves between January and March and renews its foliage between April and May.

In Bombay and the Konkan, flowering commences about the end of October and continues right into December ; in other parts of Western India trees flower in August and September. Decked in

drooping masses of snowy white flowers which stand out against the dark foliage, the tree presents a beautiful appearance. Like many of the members of its charming family, the *Bignoniaceae* (Trumpet Flowers), the flowers have a delightful fragrance which fills the surrounding air. The flowers grow in large panicles at the end of the branchlets. The tiny bell-shaped calyx bears the pendant, slender tube-like flower. This tubular portion is 2 to 3 in. long and of a faint green tinge ; it expands into waxy white petals. These are sometimes flushed with pink. The petals are oval, pointed at the apex and the largest of them is deeply cleft. There are four stamens crowned with yellow anthers. The style protrudes well beyond the petals. The fruit is slender, compressed and pointed at both ends. It grows to a foot and a half in length.

The seeds are flat. They measure an inch across. Each seed is surrounded by a tender wing which is narrowed at the top and absent at the base. The tree does not produce fruit in Western India or in the Central Provinces.

Distribution.—The Indian Cork Tree is believed to be indigenous in the tropical forests of Burma from Ava to Tenasserim and the Malay Archipelago. It is cultivated largely in many parts of India and runs wild in certain areas of Central India as in the valley of the Godavari river. Roxburgh mentions that about 1800, seeds of this tree were brought to Madras from the gardens of the Raja of Tanjore from whence a plant was also procured for the East India Company's Botanic Garden at Calcutta.

Gardening.—It is a fairly common roadside tree in Western India. Though ornamental, it is not very suitable for avenues, as it is tall rather than spreading. The tree is fast growing. The specimen in the Botanic Gardens at Calcutta, to which we refer, reached a height of 50 ft. in twelve years.

" The tree is decidedly hardy, and is not particular as to soil ; although it grows best in a moist climate, it does fairly well in dry situations. It is, however, brittle and shallow-rooted, and is liable to be broken or uprooted by strong winds. It has a tendency to send up root-suckers in great profusion, which is a disadvantage in gardens. It is easily raised from seed when obtainable, from cuttings put down in the spring or from root-suckers put down and transplanted during the rainy season. Seed should be sown in the nursery as soon as it ripens, towards the end of the hot season, and the seedlings, which bear transplanting well, should be planted out a year later at the beginning of the rainy season " (Troup).

Uses.—The wood is soft and yellowish. It is close-grained and takes a fine polish and is used for furniture and ornamental work ; weight 42 lb. per cubic foot. From the bark, which is about an inch thick, an inferior kind of cork is made.

Popular names.—Bombay : Akasnim, Nimichambeli ; *Burma* : Aykayet, Egayit ; *Canarese* : Beratu ; *English* : Indian Cork Tree, Tree Jasmine ; *Hindi* : Akasnim, Minichambeli ; *Malayalam* : Katesam ; *Marathi* : Cowlanim, Nimichambel ; *Sanskrit* : Akashanimbu ; *Tamil* : Karkku, Kattumalli, Kirimalligai, Kudasam, Malaimalligai, Maramalligai, Sakkaram, Vachagam ; *Telugu* : Akashamalle, Karaku, Kavuki, Manumalle ; *Uriya* : Machmach, Modhumodhu, Simaromonophulo.

Bignoniaceae.

The family takes its name after the Abbé Jean Paul Bignon, Court Librarian to Louis XIV of France. It is remarkable for the beauty of its flowers and principally inhabits the tropics, especially of America.

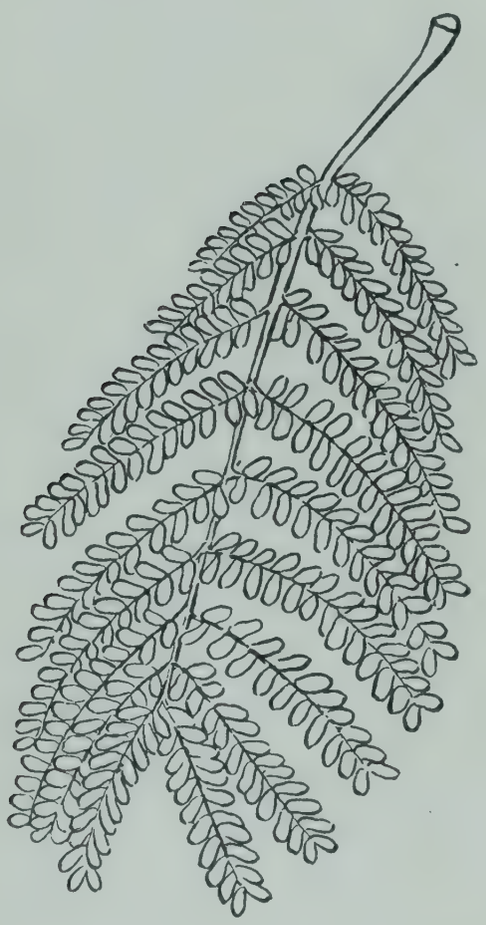
It is represented in our gardens by *Millingtonia*, *Spathodea*, *Jacaranda*, *Tecomella* and others.

THE RUSTY SHIELD-BEARER.

PELTOPHORUM FERRUGINEUM Benth.

Peltophorum, derived from the Greek, means shield-bearing in allusion to the shape of the pods which cover the tree after the flowering season. *Ferrugineum*, meaning rusty, describes the colour of the pods and tender shoots.

Description.—A large, handsome tree growing from 40 to 80 ft. in height. It has a smooth grey bark and a spreading crown of many branches. The feathery mimosa-like leaves add to its handsome appearance. The leaves are twice abruptly pinnate. They consist of a main axis or rhachis from 6 in. to a foot in length along which



are arranged some 6 to 20 pairs of pinnae, each bearing about 20 to 30 close-set stalkless leaflets. Deep green in colour the leaflets are oblong in shape, notched at the apex and unequal-sided. They are smooth above, almost leathery in texture and covered with slight down on the undersurface. In December there is a sprinkling of yellow leaves among the foliage of many of the trees in Bombay.

John Bale, Sons & Danielsson, Ltd. London

THE RUSTY SHIELD-BEARER.

Peltophorum ferrugineum, Benth.

(½ nat. size.)

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John Bale, Sons & Danielsson, Ltd London

THE RUSTY SHIELD-BEARER.

Peltophorum ferrugineum, Benth.

(½ nat. size.)

Photo by Salim A. Ali.

The Rusty Shield-Bearer (*Peltophorum ferrugineum*).
Trees growing in the vicinity of the Prince of Wales Museum, Bombay.

Leaf-fall then commences and continues through January and, though never completely denuded, by the end of the month the trees look ragged and untidy. The young leaves come out in early February. The trees are mantled in the tenderest green. In a week or two the colour changes to deep-green. About mid-February rust-red, upright shoots covered with downy hair spring up at the tips of the branches. They grow rapidly and some become quite conspicuous. They develop into many branched sprays bearing a profusion of bright yellow flowers. Crowned in their abundance of blooms the trees are a wonderful sight. The ground below them is carpeted with fallen blossoms. The flower is cupped in a coppery-red, downy calyx. Its wavy, yellow petals are inversely oval in shape, hairy at the base and much crinkled about the margins. Its ten free stamens are clothed with dense tufts of hairs at the base and crowned with golden yellow anthers. The style is long and thread-like. The copper-red pods cover the tree in profusion. They are

particularly conspicuous during leaf-fall. The pods are oblong, flat, very thin and hard, narrowed at both ends and closely veined. They grow from 2 to 4 in. in length by about an inch in breadth. The seeds are brown.

Flowering season.—In Bombay the flowering season commences in March, reaches its height in April and continues through May. Some trees come into flower later and are in full bloom during June. Alongside trees in full flower there are others in ripe fruit. There is a second blooming in September which is carried through October and November. Individual trees will be found in flower late in December.

Distribution.—The tree is a native of Ceylon, the Andamans, the Malay Peninsula and Archipelago and North Australia.

Gardening.—Much cultivated for ornament. A large number of these trees have been planted alternately with Gul Mohur (*Poinciana regia*) trees on Hughes Road in Bombay. In April and May they make a wonderful blaze of colour, their bright yellow crowns contrasting with the scarlet heads of the Gul Mohurs. The tree is easily propagated from seed, the seed pods being freely produced.

Uses.—The timber is much in request for cabinet work (Hill). It is blackish, the sapwood white, coarse, fibrous, light. (Kurz *Forest Flora of Burma.*)

Botanical name.—Under the International Rules of Nomenclature the name of this species should be *Peltophorum inerme* (Roxb.) Llanos in Blanco's *Flora Filipina*, Ed. 3, t. 335.—1882.

Inerme is from *inermis*—unarmed.

Popular names.—English : Rusty Shield-bearer ; *Tamil* : Iyalvagai, Perungondrai ; *Telugu* : Kondachinta.

The Pagoda Tree (*Plumieria acutifolia*) leafless and in flower; March.

The Frangipani (*Plumieria rubra*) in full leaf and flower; March.

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THE PAGODA TREE.

Plumieria acutifolia, Poir (Right.)

FRANGIPANI.

Plumieria rubra, Linn. (Left.)

(2/3 nat. size.)

Mr. C. E. C. Fischer of the Royal Botanic Gardens, Kew, writes as follows in reference to the name :—

"The correct name of the genus is *Plumeria*. It is made in honour of a Frenchman named Plumier, it is true, but Tournefort latinized the name to *Plumerius*. He wrote '*Plumerii*, ab inventore Clarissimo Plumerio.' Linnaeus took up the name as *Plumeria* and that spelling must be retained."

John Bale Sons & Danielsson Ltd London

THE PAGODA TREE.

Plumieria acutifolia, Poir (Right.)

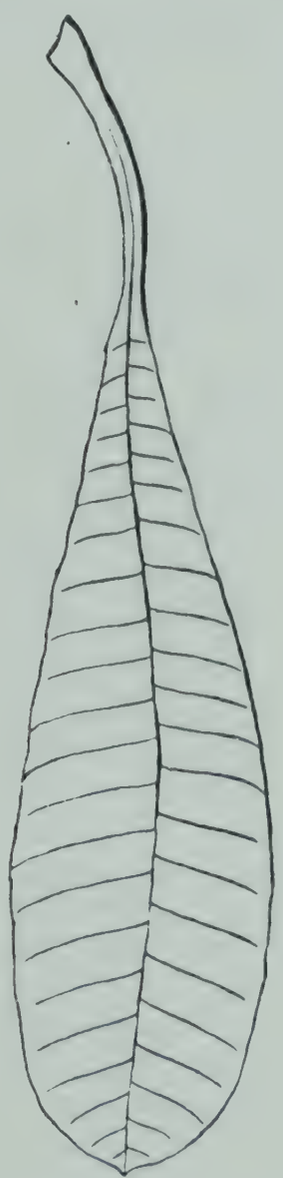
FRANGIPANI.

Plumieria rubra, Linn. (Left.)

THE PAGODA TREE.

PLUMERIA ACUTIFOLIA Poir.

The generic name *Plumeria* is after the Franciscan traveller and distinguished French botanist, Charles Plumier (1664-1706); *acutifolia* describes the pointed or tapering leaves. The genus *Plumeria* is included in the family *Apocynaceae*, the Dogbanes.



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This is the tree so frequently cultivated in the neighbourhood of temples where it supplies the continuous demand for flowers used as votive offerings to the gods. Its remarkable power of bursting into leaf and blooming even when taken out of the soil have led it to be regarded as an emblem of immortality. As such its frequent presence in graveyards is not altogether inappropriate. The author of *The Cruise of the Marchesa* refers to the Dead Man's Flower dropping its deliciously fragrant blossoms over the quaint tombs of the Sulu islanders. Writing of this tree he says "Buddhist and Mahommedan alike plant the Champac above their dead. So should we, I think, did our climate permit it. Day after day throughout the year, the tree blooms. Day after day the delicately creamy corollas fall upon the graves retaining both their freshness and their fragrance unlike any other flower."

Description.—The Pagoda Tree grows from 15 to 20 ft. in height. Its grey-coloured bark is rough and scaly. On injury the inner bark and every part of the tree exudes a copious flow of a white and viscid juice, hence its Sanskrit name, *Kishira-champa* meaning "Milky Champa." The leaves grow in crowded spirals at the tips of the branches. The leaf is slightly over a foot in length. It is smooth, broadly lance-shaped and tapers at both ends. Very distinctive are the straight, parallel veins which run from the mid-rib to the margin of the leaf, where they are absorbed in a waved vein which runs along its borders. The Pagoda Tree sheds its leaves during November and December and does not renew them till the commencement of the rains. Young trees remain in leaf through the year. In full leaf the tree is not without elegance but stripped of its handsome foliage, its crooked trunk and the grotesque outlines of its blunt and swollen branches give it an uncouth and gouty appearance. The flowers grow in upright clusters at the tips of the branches. In well-cultivated trees the clusters are large and contain quite as many as

twenty blooms. The large, waxy white flower has a distinctive golden centre. It is funnel-shaped with five spreading petals, faintly tinged with pink below. The left margin of each petal has a tendency to curl over. The stamens are inserted deep within the tube of the flower. They are not visible externally. These are perhaps amongst the most fragrant of tropical flowers. They distil, particularly at night, a perfume which is almost overpowering.

Flowering season.—February to October ; practically throughout the year.

The fruit is a pod about 5 in. long. The Pagoda Tree rarely seeds in this country.

Variety.—There is a handsome variety occasionally seen in gardens. The buds are a deep, glossy crimson. When fully open half the underside of each petal is a dull crimson, the other half creamy white. The curling edge of the petal displays a beautiful, crimson margin and the throat of the flower is more vividly golden than in the commoner variety.

Distribution.—A native of Mexico and Guatemala, the Pagoda Tree is believed by some writers, though wrongly, to be indigenous in China and Cambodia. Rhumphius, who first described the tree under the name *Flos convolutus*, says it was brought to Amboyna by Chinese merchants from Cambodia. Its Hindustani name, *Gul-e-chin*, meaning " Flower of China " and the Burmese name, *Chinachampac* rather suggest a similar origin in India, where the tree has been cultivated from time immemorial. In 1770 it was introduced into England as a hot-house plant from the East Indies.

Gardening.—The tree is propagated by cuttings which should be allowed to wilt before planting. At first they should not be kept too moist. The hot season is the best time for planting. During the cold weather large specimens may be transplanted without the accompanying soil.

Uses.—Attempts to manufacture caoutchouc from the viscid juice of this tree have been without success. The sap is employed with sandalwood oil and camphor to cure itch, and is used as a counter-irritant to cure rheumatic pains.

The bark, known as *A'chin* is recommended by the Persians as a cure for gonorrhœa and venereal sores. It is used for a similar purpose in Porto Rico. In Bombay it is used for intermittent fevers as we use Cinchona. In the Konkan, it is given with coconut, ghee and rice as a remedy for diarrhœa. A decoction from the bark makes a powerful anti-herpetic. Its use as a purgative is not without danger. Several cases of death from excessive purging after its use have been recorded. Plasters made from the bark are said to be useful in dispersing hard tumours.

The leaves after being heated, are applied as a poultice to reduce swellings. In Gōa the leaves and branches are tied round coconut palms to protect them against the attacks of the Long-horned Beetle (*Batocera rubra*).

The flower buds are taken with betel leaves as a febrifuge. The seeds, when available, are boiled in milk and given as an antidote in cases of snake bite. Mr. Millard once had a few seed-pods on one

of the trees in his garden in Bombay and his Mahratta *malis* expressed the belief that the seeds were eaten by cobras. The seeds certainly disappeared but he had his suspicion that the *malis* were in league with the cobras.

Both the bark and the fruit are useless in the antidotal and symptomatic treatment of snake bite ; the fruit is also useless as an external application to the part bitten (Mhaskar and Caius).

Popular beliefs.—It is generally admitted that the seed of the Pagoda Tree is the antidote *par excellence* in cases of cobra bite. And the proof thereof is that the tree rarely seeds—and that because cobras intentionally destroy the pods.

Popular names.—Assam : Goalanchi ; *Bengal* : Dalanaphula, Goburchampa. Gorurchampa ; *Bombay* : Chameli, Champa, Dolochapa, Gutachin, Khadchampo, Khairchampa, Sonchampa ; *Burma* : Chinachampac, Taroksaga, Tayopsagah ; *Cambodia* : Champei ; *Canarese* : Belchampaka, Champaka, Devaganagalu, Devaganagile, Ganagala, Gosampige, Kadusampage, Kanagile, Mogaganagile ; *Central Provinces* : Champa ; *Ceylon* : Alariya ; *Dehra Dun* : Gulachin, Gulchin ; *English* : Dead Man's Flower, Frangipani, Graveyard Flower, Jasmine Tree, Pagoda Tree, Spanish Jasmine, Temple Flower, Temple Tree ; *French* : Bois de lait, Frangipanier ; *Gold Coast* : Frangipani, Temple Flower ; *Gond* : Champapungar ; *Gujerati* : Dolochampo, Rhadachampo ; *Hindi* : Chameli, Goburchamp, Golainchi, Gulachin, Gulainchi ; *Indo-China* : Bong su do, Bong su ma, Champey sar, Daid hoa su trang, Kok don, Mien chi tu, Ti ampa ; *Konkani* : Portugalo champo ; *Malayalam* : Arali, Vellachampakam, Velattalari ; *Marathi* : Khairchampa, Rhuruchapha, Sonchampa ; *Mundari* : Golanchi ; *Naguri* : Golainciba, Golaincidaru ; *Persian* : Gulacin ; *Sanskrit* : Devaganagalu, Gosampige, Kishirachampa ; *Santali* : Champapungar, Gulanjbaha ; *Sinhalese* : Alariya ; *Tagalog* : Calachuchi, Calasusi, Calatsutsi, Carachucha ; *Tamil* : Ilattalari, Kallimandarai, Kuppiyalari, Navillavalari, Perungalli ; *Telugu* : Arhataganneru, Nuruvarahalu, Vadaganneru, Veyyivarahalu ; *Tulu* : Gosampige, Sampai ; *Uraon* : Gulaici ; *Urdu* : Achin ; *Uriya* : Golochi, Kutokompa, Torato ; *Visayan* : Calatucha.

A. Plumeria Tourn.

Tropical trees grown for their showy and very fragrant flowers. They are amongst the most fragrant of tropical flowers, vying in this respect with the jessamine, Cape jasmine, and tuberose. They are considerably cultivated in all tropical lands. The species are much confused and imperfectly understood.

The Frangipani.

Plumeria rubra Linn.

On our coloured plate the artist has included a flowering branch of the Frangipani, a different tree of the same genus. Frangipani is supposed to be derived from the French, *Frangipanier*, which means coagulated milk, referring to the tenacious white juice, characteristic of trees of this genus. Other accounts suppose it to have come from an Italian nobleman of that name who, in the Middle Ages, compounded a perfume of many ingredients which had an odour similar to these flowers.

Description.—Smaller than the Pagoda tree, the Frangipani grows to a height of 12 to 20 ft. With its beautiful red flowers and handsome foliage it is especially ornamental. The leaves are smaller

than those of the Pagoda Tree, being 5 to 8 in. long. The flowers grow in crowded clusters on downy, red stalks. The petals are red, centred with rich yellow. They are broadly oval in shape and rounded at the apex. The flowers have a pleasant scent which is not so overpowering as in the Pagoda Tree. In South America, women adorn themselves with these flowers and put them among linen to scent it as we do with lavender.

Distribution.—The native home of the Frangipani extends from Mexico to Guiana and Ecuador.

Economic value.—The extract, more especially that from the young branches, has been found to contain a fair proportion of caoutchouc ; an analysis showed 25·5 per cent., with 21·9 per cent. resinous matter and 15·7 per cent. water.

The plant is easily raised from cuttings (strong ends of the branches a foot or more long) and thrives in sandy or stony soil with a rainfall of about 25 in. and upwards ; it grows quickly and is very desirable for decorative purposes, though the stems have a somewhat bare appearance if not kept lopped regularly.

Popular names.—English : Jasmine Tree, Red Jasmine of Jamaica, True Frangipani ; *French Guiana* : Frangipanier rose ; *Gold Coast* : Red Frangipani ; *La Reunion* : Frangipanier rouge ; *Loanda* : Jasmin mangueira ; *Marathi* : Lalchampa.

The White Frangipani.

Plumeria alba Linn.

Another species of *Plumeria* which is not so common is the White Frangipani, *P. alba.* It is a native of the West Indies, as of Jamaica, Martinique and the mainland of South America. The tree is about 15 ft. in height. Its rigid brittle leaves are rounded at the apex. They are smooth above, hairy beneath and curl inwards at the margins. As with *P. rubra*, the tree remains in leaf through the cold and hot weather. The flowers are white without the yellow throat.

Popular names.—English : White Chumpa, White Frangipani ; *French* : Bois de lait, Frangipanier, Laurier batard ; *French Guiana* : Bois de lait, Frangipanier blanc ; *La Reunion* : Frangipanier blanc ; *Sanskrit* : Kananakaravira ; *Tamil* : Peru, Perumallari, Perungalli ; *Telugu* : Veyyivarahalu.

B. Apocynaceae.

The members of the Dog's-bane (Greek : *apo* = away with + *kyon* = dog) Family principally inhabit the intertropical zone of the Old and New Worlds, especially Asia beyond the equator. They are comparatively rare in extra-tropical hot and temperate regions. Most of the species possess a milky juice, often rich in indiarubber ; sometimes bitter and employed as a purgative or febrifuge, or depurative ; sometimes acrid and very poisonous ; sometimes mild, scarcely bitter, and simply laxative ; finally, sometimes acid-sweet or unctuous, and much sought as food.

THE GUL MOHUR OR FLAMBOYANT.

POINCIANA REGIA Bojer.

The genus is named after M. de Poinci, Governor of the Antilles in the seventeenth century.

The origin and derivation of the name "Gul Mohur" is difficult to trace. "Gul" means "rose or flower" and "Mor" is the Hindustani name for "peacock." The English name of Bengal or Royal Gold Mohur is also applied to this tree. Mr. C. E. C. Fischer of Kew considers the name Gold Mohur is a corruption of the vernacular epithet "Gulmohr" (anglice—Peacock-rose). The word "Mohur" may have been adopted from that of an old Indian coin or seal.

The tree was growing at Sewree (Bombay) about 1840 (? 1846 or 1848)—*vide* footnote on p. 114—Vol. I of the "Gazetteer of Bombay City and Island" by the late S. M. Edwardes, C.V.O., C.S.I.

Description.—A large deciduous tree, growing from 40 to 50 ft. in height with spreading branches and very handsome feathery leaves.

The foliage is particularly beautiful when the tree is young and the airy elegance of its leaves more in evidence. The leaves may attain a length of 2 ft. The leaf is composed of from 11 to 18 pinnae or minor leaves arranged in pairs along the mid-rib. The pinnae bear from 20 to 30 pairs of small oblong leaflets, each measuring $\frac{1}{3}$ to $\frac{2}{5}$ by $\frac{1}{10}$ to $\frac{1}{6}$ in. The tree sheds its leaves between February and March and during this period, which immediately precedes its flowering season, it stands gaunt and bare save for the long, sabre-like seed pods, hanging from its leafless branches. The young leaves appear towards the end of May or early in June, and by the time the rains are well established, the tree is once again covered with its feathery foliage. The flowers appear with the onset of the hot weather, a few at first, then more and yet more till by mid-May

Gul Rohsa or Flamboyant

Poinciana regia Bojer

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GUL MOHUR OR FLAMBOYANT

Poinciana regia. Bojer

(1/2 nat. size)

Photo by C. McCann.

The Gul Mohur (*Poinciana regia*) in flower.

Photo by C. McCann.

The Gul Mohur (*Poinciana regia*) in fruit.

the tree is a vivid and brilliant mass of scarlet blooms. The flowers are arranged in immense racemes at the ends of the branches. Individually examined, each flower is seen to be composed of 4 scarlet petals, while the fifth, the standard petal, is slightly larger in size and much variegated in colour. It is yellow or white and usually streaked with red. The flowers vary considerably in intensity of colouring. A whole range of tones from orange-vermilion to deep scarlet is exhibited. The deep scarlet form is particularly handsome. Each petal appears as a rounded spoon-shaped blade with a delicately crinkled margin. Its base is long and narrow, technically described as clawed. The petals emerge from between 5 fleshy scarlet-faced sepals which constitute the calyx. The stamens protrude in a cluster of 10 red filaments, surrounding a tender green style. The whole flower measures about 4 in. across.

Flowers during the hot weather.

Fruit.—The pods are green and flaccid when young. They harden with age, turn a deep brown and remain for a long time on the tree. They measure 1 to 2 ft. in length. The seeds are oblong and transversely mottled.

Distribution.—A native of Madagascar introduced within the last hundred years.

Cultivation.—The tree is largely grown throughout the Tropics for decorative purposes and as a shade tree. It grows freely in good soil, thriving best under fairly dry conditions, especially near the sea ; but great attention must be paid to pruning if a good head is to be developed.

Usually grown from seed, also raised from cuttings. The form with deep scarlet flowers is so handsome that it deserves wider propagation. As the seeds may not come true to colour, it would be advisable to make cuttings of this variety, of which there are a good number in and around Bombay. The Gul Mohur is a fast-growing tree. It has spreading superficial roots which kill out other plants. The shallow root system unfortunately renders it liable to be blown down during storms.

The Gul Mohur is often confused with the Peacock Flower or Barbadoes Pride (*Caesalpinia pulcherrima*) better known as *Poinciana pulcherrima*, and often referred to in this country as the Gold Mohur Shrub. This plant is a shrub or at most only a small tree, with strongly overlapping calyx segments in the bud, much smaller flowers and very long protruding stamens (Stewart).

Economic value.—The tree yields a gum in irregular granular or warty tears of a yellowish or reddish-brown colour ; soluble in water, forming a thick opalescent mucilage.

The wood is white, light—28 lb. per cubic foot—soft, loose-grained, and takes a fine polish.

The Gul Mohur makes a useful avenue tree, especially when planted alternately with a good shady tree.

Botanical names.—Under the International Rules of Nomenclature the name of this species should be *Delonix regia* Boj. Rafinesque in Flora Telluriana. 1836. *Poinciana elata* Linn. should be *Delonix elata* (Linn.) Gamble, Flora of the Presidency of Madras, p. 396. 1919.

Rafinesque's description is : "350. *Delonix R.* (evident claw). Legum. diff. *Poinciana*, Cal. eq. non fornic. Pet. 5, subeq. unguis longissimis, limbo, crenatis flabellatis. Stam. 10 ineq. glabris, declinatis. *D. regia* Raf. *Poinciana regia* Hook. b.m. 2884. inermis, fol. bipin. ovatobl. muticis.

"A beautiful tree of Madagascar, with large scarlet flowers. The *G. Poinciana* D.C. separated from *Caesalpinia* is American with uneq. cal. hooded, petals unequal, stamens hairy, etc."

One of the compensations of the hot weather in the plains of India is the profusion of beautiful flowering trees and perhaps one of the most conspicuous, from April to June, is the Gul Mohur.

Popular names.—In Madagascar, the tree is called "*Flamboyant*" and by some the "*Flame of the Forest*," a name which appears to be given to several trees in this country, including the Coral tree (*Erythrina indica*) described on p. 48, but we consider, in India, the name is particularly and only applicable to the Palas or Dhak tree (*Butea frondosa*).

The Ashanti name "sempowadua" or "threepence tree" was given because the seeds of this tree were originally sold in the Sunyani district for 3d. each.

Ashanti : Sempowadua, Sempowarma ; *Betsimisaraka* : Tanaho ; *Canarese* : Doddaratnagandhi, Kattikayi ; *English* : Fire Tree, Flame Tree, Gold Mohr, Gold Mohur, Gul Mohur, Royal Gul Mohor, Royal Peacock Flower ; *French* : Flamboyant ; *Malayalam* : Alasippu ; *Marathi* : Gulmohr ; *Philippines* : Arbol del fuego ; *Sakalave* : Volotsara ; *Tamil* : Mayirkkondrai, Mayirgondrai, Mayuram, Panjadi, Perumayirgondrai, Vadanarayanan ; *Telugu* : Ettaturayi, Peddaseribiseri, Peddaturayi, Simasankeswaramu, Turayi ; *Tulu* : Kodu.

A. Poinciana Tourn.

This genus is closely allied to *Caesalpinia*, and is originally distinguished from it by the great length to which the stamens project from the corolla. It is now, however, more properly confined to a few trees, including *P. elata* Linn. from India and Tropical Africa, and *P. regia* Boj. from Madagascar, in which the calyx is valvate in the bud, whilst in the true Caesalpinias it is much imbricated.

The White Gul Mohur.

Poinciana elata Linn.

Description.—An erect tree growing 20 to 30 ft. in height with a tolerably smooth ash-coloured bark. The leaves are similar in character but smaller than those of *P. regia*, being 4 to 8 in. long. The main or mid-rib of the leaf carries a smaller number of minor ribs or pinnae, there are from 4 to 8 pairs arranged opposite. The leaflets, almost stalkless, are closely set in from 10 to 20 pairs along the ribs. Their shape is linear-oblong, somewhat pointed at the apex. They are quite smooth and readily shed. The flowers grow at the end of the branches in racemes. There are not many flowers in each cluster. The stalks of the lowest flowers are longest, thus

all the flowers forming the cluster come up to the same level (corymbiform). The pedicels or stalks of the flowers are downy (pubescent). The calyx, $\frac{3}{4}$ to 1 in. long, is leathery and, like the stalk, covered with a silky down externally. The sepals or segments of the calyx are oblong, very narrow and sharp-pointed. The petals are white at first and then change to yellow. The upper petal is usually smaller and of a deeper colour than the others. The petals do not project much beyond the calyx ; in shape they are almost round (sub-orbicular) and very much curled at the margins. The stamens are downy, dark coloured, 2 to 4 in. long, and thickened at the base. The pods measure 5 to 7 in. by $\frac{3}{4}$ to $\frac{1}{4}$ in. They are smooth, narrowed at both ends and marked with a network of veins. The seeds number 4 to 8.

Flowering season.—August-March (Brandis) ; June-September (Cooke) ; in the hot season or early rains (Troup). Therefore practically the whole year. Troup calls it a practically evergreen tree.

Distribution.—Abyssinia, Arabia, in India perhaps indigenous in the Porebunder State. Cultivated in many parts of India.

Gardening.—Capable of growing in poor dry soil, even in crevices of rocks, where, however, it is stunted. Often cultivated for ornament. It grows fast and is easily raised from seed.

Commonly planted as an avenue tree in Indo-China.

It was introduced into the Botanical Garden of Calcutta in 1792 and 1799.

Economic value.—The tree yields a dark-coloured and mucilaginous but unimportant gum.

The leaves and twigs are employed in Madras as a manure.

The wood is yellow, close, and even-grained, easily worked ; gives a smooth surface ; warps slightly, but does not crack ; weight, when seasoned, 45 to 47 lb. per cubic foot. It is well suited for cabinet work.

The tree has been successfully used as a protection for the footings of rivers and channel banks, where it is not wanted to spread laterally and to cause obstructions.

Medicinal uses.—There is a popular belief that the touch of the root removes the pain of a scorpion sting.

Popular names.—Bombay : Vayni ; *Canarese* : Kempukenjiga, Nirangi, Sonkesari, Sunkanthemara ; *English* : Creamy Peacock Flower, Tiger Bean, White Gul Mohur ; *French* : Flamboyant ; *Gujerati* : Sandesra ; *Indo-China* : Diep tay, Kangok, Xoan tay ; *Marathi* : Sandesra, Sankasura ; *Tamil* : Padenarayan, Pandenaryan, Perungondrai, Vadanarayanan, Varatti ; *Telugu* : Chilikeswarapu, Chinnaseribiseri, Chittikeswaramu, Sunkeswar, Sunkeswaram, Sunkevaramu, Vatanarayana ; *Uriya* : Simamondaro.

B. Caesalpiniaceae.

They are mostly trees and shrubs with pinnate leaves and handsome, irregular flowers. They are chiefly grown for their showy flowers and also for their attractive finely divided foliage.

In the tropics, and also in subtropical climates, these shrubs and trees are always admired and are commonly planted for ornament, as *Poinciana*, *Peltophorum*, *Cassia*, *Saraca*, *Bauhinia*, *Amherstia*, *Colvillea*.

THE PADAUK.

PTEROCARPUS INDICUS Willd.

Though commonly referred to as the Padauk in towns and stations, this is not the true Padauk of Burma, which is *Pterocarpus macrocarpus*.

Pterocarpus indicus Willd. ed. sp. III, 904. Belongs to the family *Leguminosae*. The generic name derived from the Greek means winged fruit and refers to the condition of the pods produced by the trees of the genus.

Description.—The tree grows to a height of 50 ft. It has a straight trunk with smooth olive-coloured bark and a wide crown of dark-green foliage and wavy drooping branches. The branches are few and tend to form low on the comparatively short bole. The leaves, 8 to 10 in. long, grow alternately on the branches. Each leaf is composed of 8 to 10 leaflets arranged alternately on the stalk. The leaflets are 3 to 4 in. long and 2 to 2½ in. broad. They are glossed on both sides, oval, with smooth margins and notched at the apex, their stalks smooth, slightly channelled and flexuous. About the last week in May, in Bombay, or early in the rains (June), the tree is covered with clusters of fragrant deep orange or yellow flowers. They grow in single or compound racemes from the joints of the branchlets, while single racemes form a much larger panicle at the ends of the branchlets. The flower has a short, five-toothed calyx, the two upper lobes being larger than the rest. The petals comprise an erect, wrinkled, claw-like banner petal flanked by two curly wing petals of the same colour and two smaller and paler and less curly keel petals. The ten stamens are united to form two equal bunches of five, capped by small, two-lobed, deep yellow anthers, the style is shorter than the stamens and the stigma acute. The pod is 1 to 2 in. in diameter. It is round and wrinkled, very tough and woody, its central part containing one, rarely two, brown smooth and shining seeds.

Flowering and fruiting.—The flowers appear in two or three separate flushes early in the rainy season, about May to July, and the pods ripen in the cold season, about January and February (Troup).

Mr. R. H. Macaulay, of Wallace Bros. & Co. (Bombay-Burma Trading Corporation) writes as follows : "The peculiarity of the tree is that all the Padauk trees burst into flower on the same day. If I saw a Padauk in flower in the bungalow compound, I was sure to see Padauks in flower all the way down to my office in Rangoon. I think the flower did not last long and fairly soon the trees flowered

THE PADAUK.

Pterocarpus indicus, Willd.

(about 1/3rd nat. size.)

THE PADAUK.

PTEROCARPUS INDICUS Willd.

Hearth commonly referred to as the Padauk in towns and stations this is not the true Padauk of Burma, which is *Pterocarpus macrocarpus.*

Pterocarpus indicus Willd. ed. sp. III, 904. Belongs to the family *Leguminosæ*. The generic name derived from the Greek means winged fruit and refers to the condition of the pods produced by the trees of the genus.

Description.—The tree grows to a height of 50 ft. It has a straight trunk with smooth olive-coloured bark and a wide crown of dark-green foliage and wavy drooping branches. The branches are few and tend to form low on the comparatively short bole. The leaves, 8 to 10 in. long, grow alternately on the branches. Each leaf is composed of 8 to 10 leaflets arranged alternately on the stalk. The leaflets are 3 to 4 in. long and 2 to 2½ in. broad. They are glossed on both sides, oval, with smooth margins and notched at the apex, their stalks smooth, slightly channelled and flexuous. About the last week in May, in Bombay, or early in the rains (June), the tree is covered with clusters of fragrant deep orange or yellow flowers. They grow in single or compound racemes from the joints of the branchlets, while single racemes form a much larger panicle at the ends of the branchlets. The flower has a short, five-toothed calyx, the two upper lobes being larger than the rest. The petals comprise an erect, wrinkled, claw-like banner petal flanked by two curly wing petals of the same colour and two smaller and paler and less curly keel petals. The ten stamens are united to form two equal bunches of five, capped by small, two-lobed, deep yellow anthers. The style is shorter than the stamens and the stigma acute. The pod is 1 to 2 in. in diameter. It is round and wrinkled, very tough and woody, its central part containing one, rarely two, brown smooth and shining seeds.

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THE PADAUK.

Pterocarpus indicus, Willd.

(about 1/3rd nat. size.)

Flowering spray of the Padouk (*Pterocarpus indicus*).

The Padouk Tree, *Pterocarpus indicus* (Ballard Estate, Bombay).

again. The Burmans used to say that the rains would not come until the Padauk had flowered three times."

The flowers are so short-lived that it has been with much difficulty that we have been able to obtain a coloured sketch of this tree.

Distribution and habitat.—Common as a roadside tree all over the Malay Peninsula, is believed to be indigenous in the Malay Peninsula and Archipelago, whence it has been introduced into Burma, where it has been largely planted in gardens and along roadsides and avenues in the damper parts of the country. It has also been planted to a small extent about Calcutta and Madras. More recently it has been introduced into Bombay, where it promises to do well (Troup).

This tree was first introduced into Bombay by Mr. Justice (afterwards Sir Edmund) Fulton, I.C.S., who sent three or four young trees from Rangoon to Mr. W. S. Millard about 1906. These were all planted and have flourished, the one planted in the University Gardens flowering each year towards the end of May. There are a considerable number of these trees growing in and around Bombay now.

Gardening.—The tree may be propagated from seed, loose soil and protection from sun favour the early development of the seedling, but the seedlings are very sensitive to frost and do not survive when frosts are prevalent. The tree thrives best in a tropical climate with a rainfall of not less than 60 in. It requires a deep well-drained soil and does not thrive on stiff clay. The tree is commonly propagated by large cuttings, which should be planted in the prepared pits in rather sandy soil early in the rainy season, or, if watering can be carried out about the month of February. Nursery raised plants are ready for transplanting at the commencement of the second rains, when they are rather more than one year old ; planting can be most successfully carried out by transferring the seedlings to bamboo baskets during the first rains and planting them out in the baskets during the second rains (Troup).

Uses.—In Burma the tree is often cultivated for its sweet-scented flowers and as an ornament. As it is in full foliage during the hot weather it is largely planted for shade.

The wood is used for furniture, and is excellent for carts and gun-carriages.

The tree produces a gum which, when dried, is as good as the true Indian kino derived from *P. marsupium*.

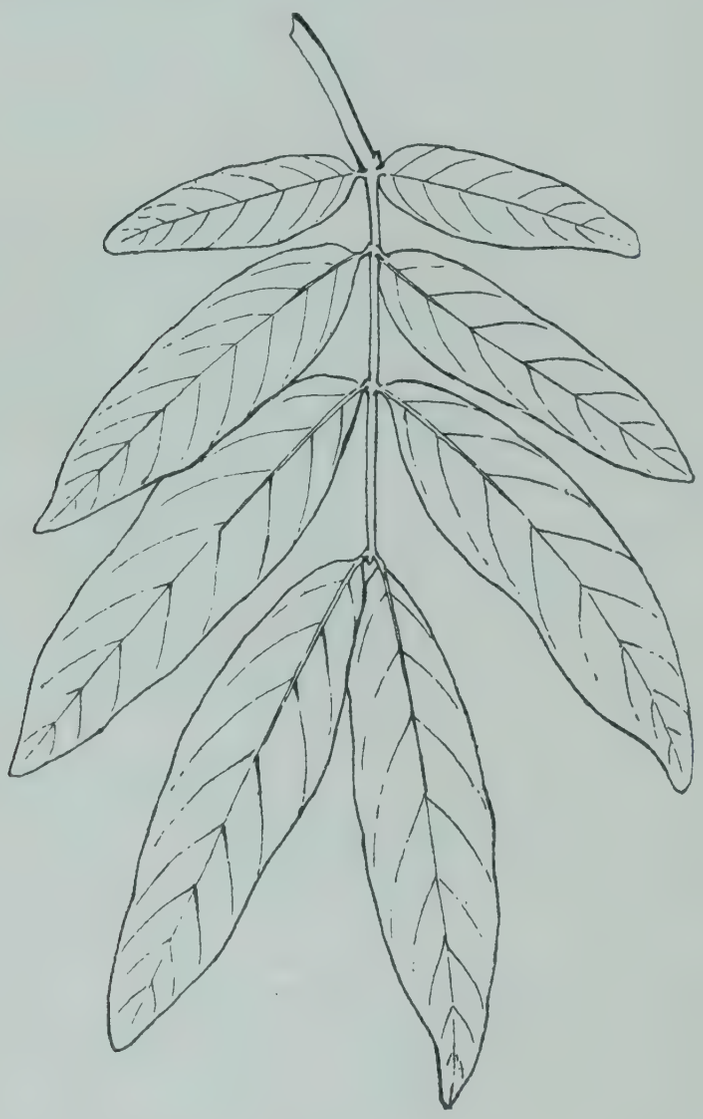
The kernel of the fruit is emetic. The wood is much used in Cambodia for its antithermic and antimalarial properties ; it is also considered diuretic and antidysenteric.

Popular names.—Andamans : Chalangada ; *Burma* : Padauk, Pa-touk, Toungkhayai ; *Cambodia* : Chan kraham ; *Canarese* : Honne ; *English* : Andaman Redwood, Malay Padauk, Padauk ; *Malaya* : Angsana ; *Philippines* : Agana, Antagan, Asana, Daitanag, Naga, Narra ; *Tamil* : Vengai ; *Telugu* : Ettavegisa, Gandamrigapunetturu, Simagandamrigapunetturu.

THE ASOKA TREE.

SARACA INDICA Linn.

The origin of *Saraca* is somewhat doubtful. Bailey derives it from *Sarac*, the name of the genus in India ; Chibber says it comes from an American name. This is most unlikely, as all the species of *Saraca* are natives of tropical Asia. There is, besides, the fact that Linnaeus coined the name *Saraca* as early as 1795.



Description.—A small evergreen tree with an erect trunk covered with smooth dark-brown or greyish-brown bark. Its branches, spreading in every direction, form an elegant close-leafed crown. The leaves grow alternately on the branches. They are sessile, being without a pedicel or foot-stalk. The leaf is about a foot in length. The mid-rib is smooth and round and carries 4 to 6 pairs of leaflets without a terminal leaflet at the apex. The leaflets are

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Saraca indica, Linn
(½ nat. size.)

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Description.—A small evergreen tree with an erect trunk covered with smooth dark-brown or purplish-brown bark. Its branches, spreading in every direction, form an elegant close-leafed crown. The leaves grow alternately on the branches. They are sessile, being without a petiole or leaf-stalk. The leaf is about a foot in length. The mid-rib is smooth and round and carries 4 to 6 pairs of leaflets without a terminal leaflet at the apex. The leaflets are

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THE ASOKA TREE.

Saraca indica, Linn.

(½ nat. size.)

The Asoka Tree (*Saraca indica* Linn.)

Flowers and Fruit of the Asoka Tree (*Saraca indica* Linn)

smooth and glossy, firm in texture with slightly waved margins. The tree is interesting as furnishing an example of drooping young leaves without chlorophyll, like those of certain other evergreen trees, for example, *Amherstia nobilis*, *Mesua ferrea*, *Mangifera indica*, *Polyalthia* and others. The young leaves are red in colour, thin and flaccid, and hang vertically downwards for some time after attaining full size. The flowers appear in large compact clusters which spring direct from the heavy branches or from the slender terminal twigs. On opening, the flowers are a bright orange and later turn red giving each cluster a richly variegated tone. In full bloom, the Asok is beautiful ; its orange and scarlet clusters of flowers contrasting richly with the dark branches and deep-green foliage. The flower has a small red leafy bract at the base of the stalk ; its calyx is formed of two small heart-shaped bract-like leaves which mark the termination of the flower-stalk. The corolla is long and tubular, tapering at its base, funnel-shaped at the apex where it divides to form 4 oval petals. A fleshy annular ring on the summit of the

corolla-tube bears 4 to 7 spreading thread-like stamens, crowned with small kidney-shaped anthers. The style is nearly as long as the stamens. The pod is 6 to 10 in. long—fleshy red when unripe. It is scimitar-shaped and contains 4 to 8 smooth grey seeds the size of a chestnut.

Flowers.—January to April or May.

Distribution.—Found wild along streams or in the shade of the evergreen forests in the Khasia Hills, Chittagong, Arakan, Tenasserim, Upper Burma, The Northern Circars, and the West Coast of Bombay, Ceylon, Malaya.

Economic value.—The wood is light reddish-brown, soft ; heartwood hard and dark coloured ; weight 50 lb. per cubic foot. In the northern parts of Ceylon the timber is used for common house-building purposes.

Medicinal properties and uses.—The bark is much used by native physicians in uterine affections, and especially in menorrhagia. A

decoction of the bark in milk is generally prescribed. A *ghrita* called *asoka ghrita* is also prepared with a decoction of the bark and clarified butter together with a number of aromatic herbs in the form of a paste. In Orissa the bark is said to be used as an astringent in cases of internal hæmorrhoids.

The flowers, pounded and mixed with water, are used in hæmorrhagic dysentery.

Popular beliefs.—The Asoka is one of the sacred trees of the Hindus which they are ordered in the Urapaj to worship on the 13th day of the month Chaitra, i.e. December 27. Its flowers, probably on account of their beauty and the delicacy of their perfume which in the months of April and May is exhaled throughout the night, are much used in temple decoration. "The tree is the Symbol of Love, and is dedicated to Kama, the Indian God of Love. Like the *Agnus castus* it is believed to have a certain charm in preserving chastity ; thus Sita, the wife of Rama, when abducted by Ravana, escapes from the caresses of the demon and finds refuge in a grove of Asokas. In the legend of Buddha, when Maya is conscious of having conceived the Buddisattva, she retires to a wood of Asoka trees and then sends for her husband." The word Asoka signifies " that which is deprived of grief " (Folkard, *Plant-lore and Legends*). Mason (*Burma and its People*), says the tree is held sacred among the Burmans because under it Gautama Buddha was born, and immediately after his birth delivered his first address.

According to Sanskrit poetry, its nature is so sensitive that it bursts into blossom and blushes crimson if touched by the hand of a lovely woman.

Popular names.—Bengal : Asok, Asoka ; *Bombay* : Ashok, Asok, Asoka, Jasundi ; *Burma* : Thawgabo, Thawka ; *Canarese* : Achenga, Akshath, Ashanke, Ashoka, Ashuge, Asoka, Kenkali, Kusge ; *Cuttack* : Aseka, Ati ; *English* : Asoka Tree ; *Gujerati* : Ashopalava ; *Hindi* : Ashok, Asok ; *Kolami* : Husangidba, Usangidba ; *Konkani* : Assoc ; *Malayalam* : Asoka, Hemapushpam, Vanjulam ; *Manipur* : Asoka ; *Marathi* : Ashoka, Jasundi ; *Mundari* : Husanggidhadaru ; *North-Western Provinces* : Asok ; *Punjab* : Asok ; *Sanskrit* : Ashoka, Kankali, Kankelli, Vanjula, Vanjuldruma, Vishoka, Vitashoka ; *Sinhalese* : Diyaratmal, Diyeratembela ; *Tamil* : Asogam, Asogu, Anagam, Malaikkarunai, Sasubam ; *Telugu* : Asokamu, Vanjulamu ; *Uriya* : Osoko.

1. The Scarlet-Bell Tree
(*Spathodea campanulata*).
Victoria Gardens, Bombay.

Photos by C. McCann.

2. Flowers of the Scarlet-Bell Tree
(*Spathodea campanulata*).

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THE SCARLET-BELL TREE.
Spathodea campanulata, Beauv.
(2/5 nat. size.)

SCARLET-BELL OR FOUNTAIN TREE.

SPATHODEA CAMPANULATA Beauv.

The generic name *Spathodea* is derived from the Greek, meaning spathe, in allusion to the spathe or ladle-like shape of the calyx. The specific name *campanulata* denotes the bell-shaped flowers.

The Spathodeas, of which there are [illegible] species, are handsome evergreen trees with large pinnate leaves, and very showy orange-red or scarlet flowers.

Description.—This is one of the most glorious trees in Bombay gardens. Tall and erect, it grows to a height of 70 ft. Although a large tree in Bombay, it attains finer proportions in Bangalore, where it has not to contend against the high winds which prevail in Bombay during the monsoon. In the drier areas the tree is deciduous for a few weeks during the hot weather, but in the humid climate of the west coast it remains evergreen.

The tree has a large compound leaf. It is odd-pinnate. The leaflets or pinnæ grow opposite each other along the main axis which ends in a terminal pinna. There are from 9 to 19 smooth, oval, abruptly pointed leaflets. They have very short stalks and bear from 2 to 3 fleshy glands at the base. The shoots are velvety, the young leaves somewhat hairy beneath. During the cold weather

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the velvety olive green buds appear in huge clusters at the tips of branches. They are close packed, curved over one another and form a compact globular mass which expands into a great panicle of lovely erect blooms, crowning the tree with a blaze of orange and crimson. Its vivid beauty compels attention. From its curving, boat-shaped calyx the flower emerges as a short tube which abruptly expands into a wide bell some 4 in. long. The lobes of its petals are oval in shape and somewhat wavy. Externally the flower is orange at the base, deepening rapidly into brilliant crimson. It is edged with a fine yellow margin. Within, it is a rich yellow cup heavily streaked with red. The 4 yellow, protruding stamens are capped with pendant brown anthers. At the base of the style is the oblong papillose ovary containing ovules packed in several rows.

The fruit is a smooth, woody, oblong, lance-shaped capsule, pointed at both ends. The seeds are elliptic, broadly winged. The trees do not often produce seed in Bombay and very rarely do so in Ceylon.

Flowering season.—In Ceylon the trees flower throughout the wet season. In Bombay chiefly during the cold weather, particularly in February and March, some individuals during the rains in September and October. In Angola the trees flower from September to the end of May, and fruit in June and July.

Distribution.—The Scarlet-Bell Tree is a native of tropical Africa. It was introduced into Ceylon in 1873. There seems to be no record of when it was introduced into India.

In Africa it is widely spread from Sierra Leone to the Congo and Angola, extending to Uganda.

Gardening.—For scenic planting in extensive grounds this is one of the finest trees in the country. Clusters of these trees make the expansive lawns of the Willingdon Sports Club, Bombay, radiant during the cold weather. The tree thrives well up to an altitude of 4,000 ft. and is suited to districts where the rainfall is not too great. It can easily be propagated from root suckers which appear freely round the base of the tree, or from cuttings ; it may also be raised from seed. It demands rich and well-drained soil with sufficient moisture during the growing period.

Uses.—The tree is useful for shade and makes a splendid avenue ; it is a fine decorative tree.

The liquor obtained by boiling the centre of the fruits when they are hard is poisonous and used by native hunters to procure meat.

The tree is such a poor firewood that the fact has been recorded in the form of an Ashanti proverb.

The two sides of blacksmith's bellows are made from this tree.

The wood is white and very soft ; density 0·363. It is suitable for carpentry work and has been suggested for use in paper making. A specimen of the wood in the Kew Museum, grown in Madras, weighs 40 lb. per cubic foot. The softness of the wood is proverbial on the Gold Coast where its name is used to designate weak people.

The buds are popularly used by the native boys as water-squirts.

Popular names.—The terms "Squirt" and "Fountain Tree" in English, "Nirukayi" in Canarese, "Korkornsu" in Ashanti, "Adatsigo" in Ewe, refer to the liquid contents of the buds.

Accra: Osisirin, Seseru; *Angola*: Sambi-sambi; *Ashanti*: Korkoranidua, Kokornsu, Osisiriro; *Baganda*: Kifabakasi; *Benin*: Okwokwi; *Canarese*: Nirukayi; *Congo*: Mombata; *English*: African Tulip Tree, Fountain Tree, Scarlet Bell Tree, Squirt Tree, Tulip Tree; *Ewe*: Adatsigo; *French*: Tulipier du Gabon; *Gold Coast*: Odoumanki: *Golungo Alto*: Andenandua, Mangelandua, Mutenandua, Mutenguenandua, Ndemand; *Ivory Coast*: Gouro, Kokomayur, Nkokion; *Krobo*: Votso; *Lagos*: Oruru; *Lakolela*: Mombata; *Mbonoi*: Kokomayur; *Sierra Leone*: Tchioge; *Telugu*: Patade, Patadiya; *Twi*: Osisiriw; *Uganda*: Kifabakasi; *Yoruba*: Oruru.

THE LARGE-FLOWERED NIGHTSHADE OR POTATO TREE.

SOLANUM MACRANTHUM* Dun.

Belongs to the family *Solanaceae* of which the Potato is the best-known representative. *Solanum* is from the Latin *Solatium* = Solace, because of the sedative properties which its several species exercise to lull pain. *Macranthum* from the Greek *makros* = large and *anthos* = flower, in reference to the size of the flowers.

Description.—A shrub or small tree occasionally reaching a height of 30 to 40 ft. with yellowish-brown straight prickles. Leaves large,

* This tree has recently been identified by Mr. C. E. C. Fischer of Kew as *Solanum Wrightii* Benth., from botanical specimens sent to him from Bombay.

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Solanum macranthum, Dun.

(about 3/4 nat. size)

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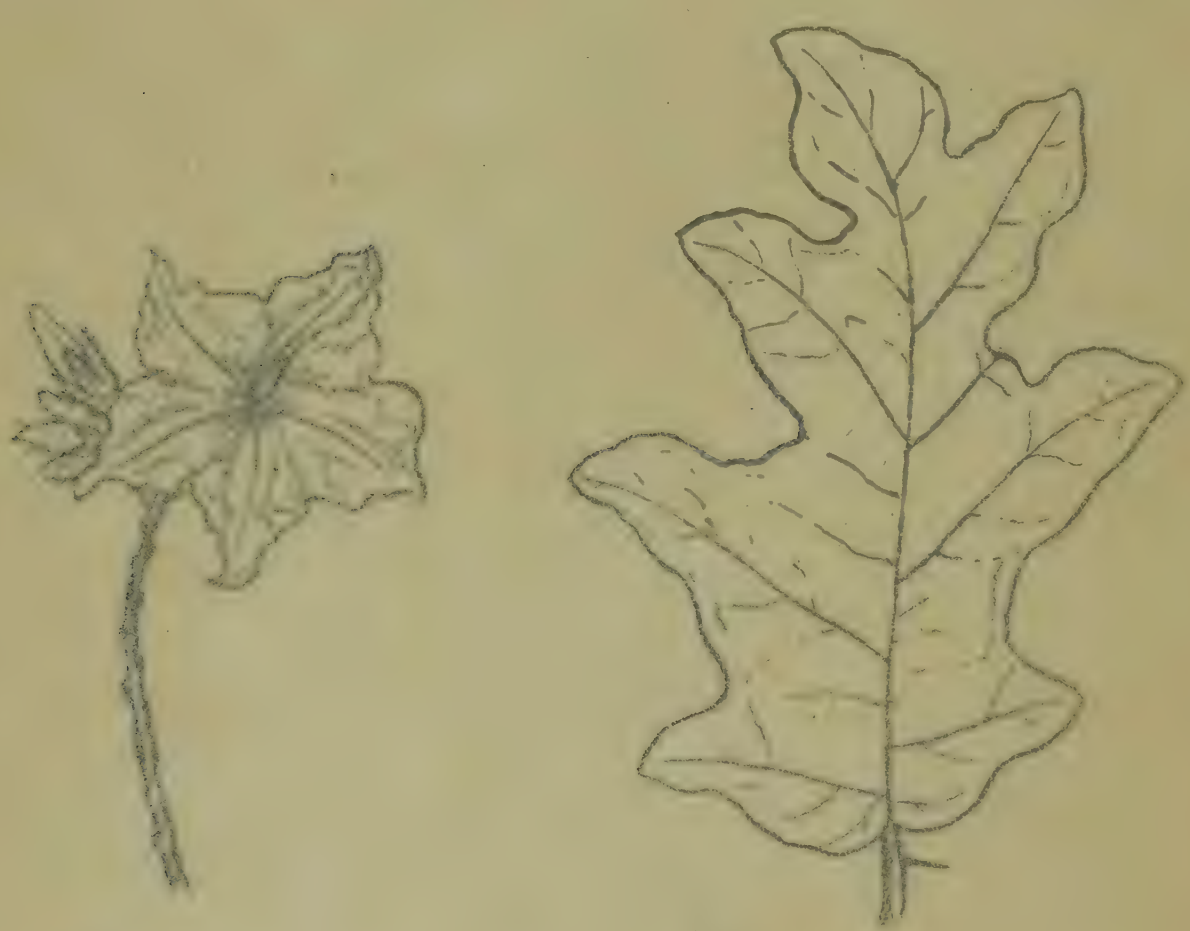

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LARGE-FLOWERED NIGHTSHADE OR POTATO TREE.

Solanum macranthum, Dun.

(about ¾ nat. size)

Flowers of the Large-flowered Nightshade or Potato Tree.

[*Photos by H. N. Wandrekar.*

The Large-flowered Nightshade or Potato Tree (*Solanum macranthum* Dun.).

10 to 15 in. long sometimes narrowing at the base forming a winged leaf-stalk. The leaf is slightly heart-shaped, egg-shaped, lance-shaped, or elliptically lance-shaped with deeply cut angles or lobes. It is paler beneath, covered with fine star-like hairs. The young leaves and shoots are densely covered with the same covering. The leaves on the undersurface are strongly armed with long prickles arranged at intervals along the nerves. The flowers are arranged in simple or branched bunches 3 to 5 in. long from 7 to 12 in number. The corolla is bluish-violet, $1\frac{1}{2}$ to $2\frac{1}{2}$ in. in diameter, the lobes are sharply pointed. The anthers are large and yellow. The fruit is almost rounded, the size of a golf ball.

Distribution.—The Large-flowered Nightshade or Potato Tree is a native of Brazil.

Gardening.—This plant is widely cultivated in gardens for its large showy flowers and beautiful leaves. It flowers all the year round. It is easily propagated from seed or cuttings. Thrives best in sheltered and partially shaded situations, up to 3,000 ft. or higher if not exposed to strong winds. It was first introduced into Ceylon in 1844. This is probably the only species of the potato family that attains the form of a tree.

THE COLOURED STERCULIA.

STERCULIA COLORATA Roxb.

Sterculia from Sterculius of Roman mythology, derived from *stercus*, dung. The Romans in the height of paganism deified the objects of their greatest dislike and most immoral actions. Thus they have the gods Sterculius, Crepitus, and the goddesses Caca and Petunda. The flowers and leaves of some species of Sterculia are ill-smelling. *Colorata* means coloured, referring to the orange-red calyx.

A very conspicuous tree when in flower from March to May. The tree is leafless at this period and the branches and twigs are covered

with coral-red flowers and as these fade, their place is taken by the winged leaf-shaped follicles which are pink at first and turn red later. These bear on the edges one or two seeds. The tree is fairly common at Khandalla on the Western Ghats and there used to be a few trees growing in Bombay fairly recently.

Description.—A large tree with a straight, sometimes fluted trunk covered with thick, scaly, ash-coloured bark and a crown of spreading branches. The leaves are crowded together at the ends of the branches. They grow on slender stalks 4 to 12 in. long. The leaf is broader than long ; it measures 4 to 8 in. in length and is from 5 to 12 in. in width. It has 3 to 5 points formed by shallow triangular lobes which taper acutely towards the tips. In the older trees the

John Bale Sons & Danielsson Ltd London.

COLOURED STERCULIA.
Sterculia colorata, Roxb.
(about ½ nat. size).

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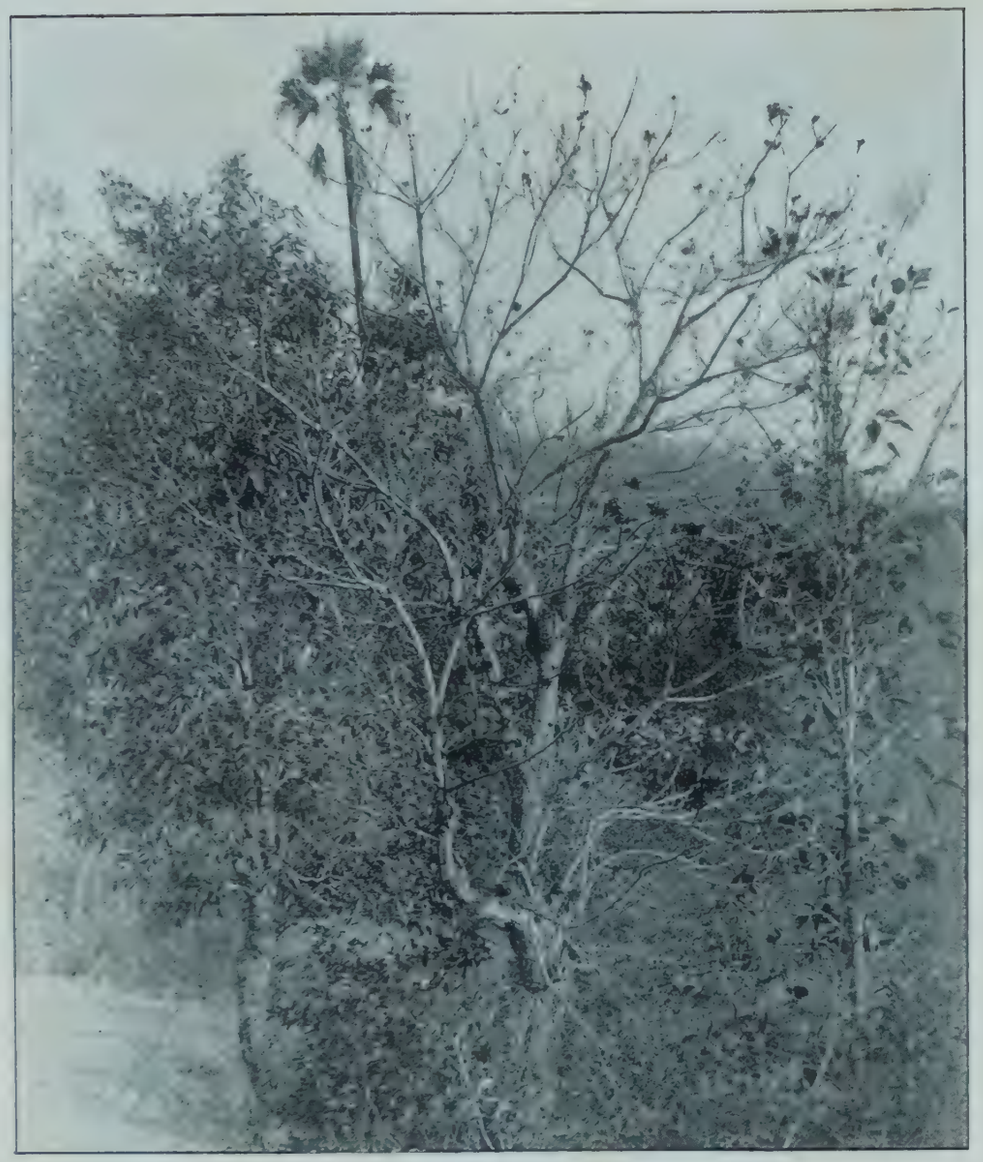

The Coloured Sterculia (*Sterculia colorata*), in flower.

Flowers of the Coloured Sterculia (*Sterculia colorata*).

Photos by C. McCann.

number of these lobes is usually three, but in the younger plants and seedlings, the number of points is increased. Young leaves and shoots are always downy. The older leaves are smooth on both surfaces, but this is a character which differs in different localities. There are varieties of this tree in which the undersurface of the old leaf is hairy. The tree commences to shed its leaves in November and is leafless from January to April, when the young leaves commence to sprout. This generally takes place after the tree has burst into flower. The Coloured Sterculia is then a conspicuous and brilliant sight. In the forests of the Western Ghats and the Deccan where the tree is common, these trees in flower appear on the hill sides and in the ravines like masses of flaming red coral. The flowers grow in short dense panicles at the ends of the branches.

Their colour varies from bright coral or orange-red to greyish-brown. The stalks, the flowers and the stem on which they grow are covered with fine downy hairs, giving the whole inflorescence a soft, velvety appearance. The calyx of the flower is funnel-shaped. The petals form a long, lobed tube from which the column of the stamen protrudes, bearing at its summit about 30 yellow anthers. The style is short and recurved. The interior of the flower is deep red. The fruits are numerous and conspicuous and might be mistaken for leaves. The fruit is composed of from 2 to 5 leaf-like membranous valves growing on a common stalk. These valves are green or pinkish on the outside and yellowish within. They open much before the fruit is mature, revealing usually two yellow, much wrinkled seeds the size of a small bean, adhering one to each margin of the valve.

Flowering season.—March to May. Fruits, May to June. New leaves, April to May.

Distribution.—Satpuras up to 3,700 ft. ; West Ghats from South Kanara to Travancore, Konkan and Deccan Forest, North Circars, Mount Abu, East Bengal, Burma, Andamans, Ceylon, Indo-China, Siam.

Economic value.—The bark yields an inferior kind of fibre, strong but coarse, which is sometimes made into ropes.

The wood is dingy, greyish-white in colour, very soft, marked with conspicuous medullary rays.

The twigs and leaves are used in the Western Peninsula as a cattle fodder.

Domestic uses.—The flowers are used in some parts of the country, such as the Berars, to decorate the horns of cattle during the Holi Festival.

Botanical name.—Under the International Rules of Nomenclature the name of this species should be *Erythropsis colorata* (Roxb.) Burkill in *The Garden's Bulletin*, Straits Settlements, v. 231, 1931.

Erythropsis is from the Greek *Erythros*—red—and *opsis*—aspect or appearance.

Popular names.—Andamans : Berda ; *Bengal* : Mula ; *Berar* : Khowsey, Pinj ; *Bombay* : Bhaikoi, Bheckhol, Samarri, Walena ; *Burma* : Wetshaw, Yasengshaw ; *Canarese* : Bilisulige ; *Garo* : Bolazong ; *Hindi* : Bodula, Samarri, Walena ; *Kharwar* : Lersima ; *Kolami* : Pisi, Sisi ; *Kumaon* : Bodal, Bodala ; *Lambadi* : Kodokili ; *Lepcha* : Kanhlyen ; *Malayalam* : Malamparatti ; *Merwara* ; Mutruk ; *Nepal* : Omra, Phirphiri, Sitto udal ; *Saora* : Kodijuttu ; *Tamil* : Malambarutti ; *Telugu* : Gudilapu, Karaka, Karuboppayi, Karupayu, Karuchichche, Kondatamara.

Sterculiaceae.

They consist of tropical South African or Australian herbs, shrubs, or trees furnished sometimes with large and handsome flowers, such as *Sterculia* and *Kleinhovia*.

Wavy-leafed Tecomella (*Tecomella undulata* Seem.) Tree in flower, Maval, Rajputana.

Flowers of the Wavy-leafed Tecomella (*Tecomella undulata* Seem.)

Photos by C. McCann.

John Bale Sons & Danielsson Ltd London

WAVY-LEAFED TECOMELLA.

Tecomella undulata, Seem.

(about ⅔ nat. size)

THE WAVY-LEAFED TECOMELLA.

TECOMELLA UNDULATA Seem.

Belongs to the family *Bignoniaceae*. *Tecomella* is derived from the generic name *Tecoma*, itself derived from the Mexican name of a plant: *Tecomaxochitl* (*tecomatl* = vessel + *xochitl* = flower).

Description.—A large shrub or small tree with drooping branches and greyish-green foliage. Leaves 2 to 5 by $\frac{3}{8}$ to $1\frac{1}{4}$ in. narrowly oblong, blunt at the apex and with wavy margins, covered with mixing hairs and slightly rough; leaf stalk 1 in. long. Flowers large, from pale yellow to deep orange; inodorous, in smaller or larger 5 to 10 flowered bunches at the ends of the smaller lateral branches; stalks $\frac{1}{4}$ to $\frac{1}{2}$ in. long, cup-shaped with 5 almost equally rounded lobes, veined. Stamens 4, filaments smooth. Stigma divided into two lobes. Fruit 8 in. long by $\frac{3}{4}$ in. broad, slightly curved, parallel sided, smooth and sharply pointed at the tip. Seed winged 1 by $\frac{3}{8}$ in. (including the wing), wing thin, very narrow, rounded at the top and absent at the base of the seed.

Distribution.—India, Western Peninsula, Punjab, Rajputana, Baluchistan; Arabia.

Gardening.—A very handsome tree when in full bloom and really worthy of cultivation. It is easily propagated from seed or cuttings (Troup). It is not uncommon in the drier tracts of India, flowering between February and April.

Economic value.—The plant is said to yield a gum. In Las Bela the bark is used for tanning skins.

The foliage is greedily browsed by cattle; the leaves are used as a fodder for goats in Las Bela. The wood is strong, tough and durable; takes a fine polish, and is highly prized for furniture (Watt. *Dict. Econ. Prod.*). The wood is yellowish-brown, mottled, handsome, highly prized for furniture, carving and agricultural implements (Brandis). It is drought-hardy and very resistent to fire. It would be a useful species for afforesting dry tracts (Troup). At Wad in Kalat it is used for making basins.

Popular names.—*Baluchistan*: Parpuk, Rori; *Bolan*: Parpuk; *Bombay*: Lohero, Lohuri, Rakhtreora, Roira, Rugtrora; *Brahui*: Parpuk; *Hindi*: Rugtrora; *Jodhpur*: Rohera; *Las Bela*: Lahiru; *Marathi*: Rakhtreora, Rakhtroda, Rakhtroda; *Mashudi*: Ribdunk; *Merwara*: Rohera, Roira; *Punjab*: Lahura, Lusi, Rogdan, Reodhan, Rohira, Roir; *Pushtu*: Raidawan, Rebdan, Rebdan, Regdesran, Reodan; *Sanskrit*: Chalachhada, Kutashalmali; *Sind*: Khen, Khew, Lahero, Lohera, Lohira, Lohuri; *Wad*; Parpuk; *Waziri*: Ribdhvan.

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THE BHENDI TREE.

THESPESIA POPULNEA Corr.

The generic name is derived from *Thespesios*, divine, in allusion to its being frequently planted near churches. Although often grown in the compounds of temples, particularly in South India, the name is hardly appropriate so far as India is concerned. The similarity of the Bhendi's leaves to the Poplar is signified in the term *populneus*.

Description.—The tree reaches a height of 30 to 50 ft. Its smooth grey trunk is tall and straight. Its numerous branches form a heavy spreading crown of close-set foliage. The broad, heart-shaped leaves grow alternately about the ends of the branches. A single leaf is from 3 to 6 in. long. It has a fine tapering point, much like

the leaf of our Pepul or of the Poplar. It is smooth, has a close network of fine veins and from 5 to 7 prominent veins which radiate outwards from the base of the mid-rib. One, or at times, both sides of the leaf bear a few minute, ash-coloured scales, each carrying a dark central spot. The Bhendi is evergreen, its change of leaf is gradual but is particularly marked in February when many of the old leaves turn bright yellow and at a distance give the tree an appearance of being in bloom. The flowers are 3 to 4 in. across. They grow singly or in pairs. The pale lemon-yellow blooms with a deep maroon centre are very beautiful. When withering they

Flowers of the Bhendi Tree (*Thespesia populnea*).

The Bhendi Tree (*Thespesia populnea*).

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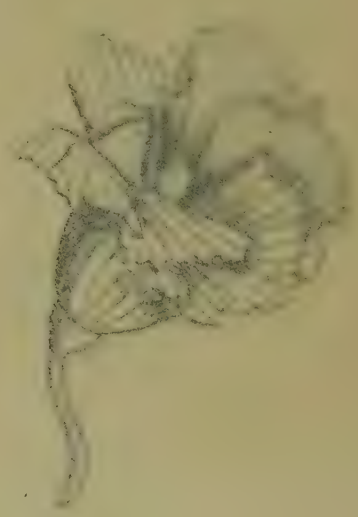
Description.—The tree reaches a height of 30 to 50 ft. Its [illegible] grey trunk is tall [illegible] spreading crown of close-set foliage. The broad, heart-shaped leaves grow alternately about the ends of the branches. [illegible] leaf is from [illegible] in long. It has a few tapering [illegible]



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THE BHENDI TREE.

Thespesia populnea, Corr.

(2/3 nat. size.)

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Flowers of the Bhendi Tree (*Thespesia populnea*).

The Bhendi Tree (*Thespesia populnea*).

fade gradually from salmon pink to a dull purple. The petals are finely crinkled and are set in a cup-like calyx. The long style grows through a tube, decked with a cluster of golden-headed stamens. It is crowned with a club formed of five close-set stigmas. The globular turban-shaped fruit is cupped at its base in the calyx which persists after the petals have fallen. It contains 5 cells, each packed with from 1 to 3 down-covered egg-shaped seeds. The fruits are green at first but turn brown and then black with age. They remain for a long time on the tree. The flower and fruit have the aspect of the *Hibiscus* in which genus of plants the Bhendi was formerly included. But the close-set stigmas, the woody character of the fruit and the flat, egg-shaped seeds are distinctive characters in *Thespesia populnea*.

Flowering season.—The tree flowers throughout the year but particularly at the beginning of the cold season.

Distribution.—It grows wild along the beach and tidal forests of our west coast from the Konkan southwards, coasts of Chittagong and the Andamans. Littoral throughout the tropics.

Gardening.—The Bhendi is a common roadside tree on the Bombay side of India. It prefers a light porous soil and is easily raised from seed or cuttings and grows quickly. When grown from cuttings, as most trees appear to be, they are crooked and distorted but the handsome heart-shaped leaves and large tulip-like flowers make this tree very noticeable.

Economic value.—The tree is valued for its tough, fine-grained timber which is used for the manufacture of gun-stocks, cartwheels and, because of its resistance to water, in boat-building. The bark yields a fine tough fibre which appears to be rarely employed in India except in the rough state for tying bundles of wood ; it is used in Burma for cordage, and in Demerara for making coffee bags.

Both the bark and the heart-wood contain tannin and a fine red colouring matter. The flowers and fruit yield a yellow dye not unlike gamboge ; in the Gold Coast Colony it is sometimes smeared on the skin or used as a paint by children.

The leaves are used for wrapping food.

The seeds yield a deep, red-coloured and somewhat thick oil, known as "huile amère."

Medicinal properties and uses.—The viscid, yellow juice with which the fruit abounds is also used as an external application in scabies

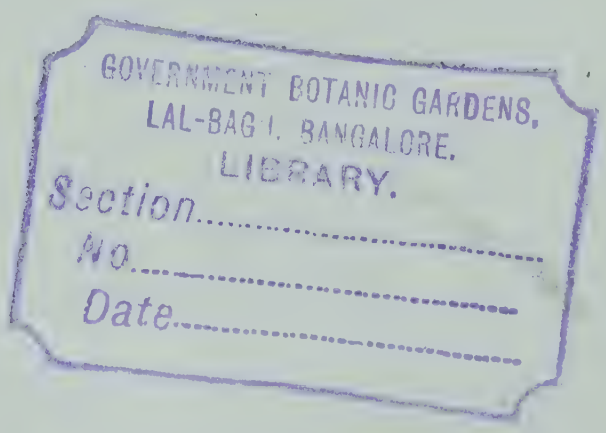
and other cutaneous diseases. Experiment has however shown that in most instances it produced little or no benefit. The leaves are applied as poultices to swellings, sores and abscesses. A decoction of the bark is used as a wash for skin diseases and is given internally as an alterative. The root is taken as a tonic.

The deep red heart-wood is spoken of as a remedy in heart attacks and in a kind of pleurodynia which is prevalent among the Malays.

Popular names.—Ahanta : Tamsi ; *Bengal* : Dumbla, Gajashundi, Palaspipal, Parash, Pares, Paresh, Parespipal, Porash, Prash ; *Bombay* : Bhendi, Bhindi, Palaspiplo, Parsipu ; *Bougainville Straits* : Kaikaia ; *Canarese* : Arasi, Asha, Bangali, Bugari, Gandarali, Hurvashi, Huvarasi, Jogiyarale, Kandasola ; *Central Provinces* : Ranbhendi ; *Ceylon* : Karavachu, Suriyagas ; *Cuba* : Majagua de Florida ; *Deccan* : Paraspippal, Paris ; *English* : Bhendi Tree, Portia Tree, Tulip Tree, Umbrella Tree ; *Ewe* : Borborsenya ; *Fanti* : Adormba, Frefi ; *Fiji* : Mulo ; *French* : Porcher ; *Ga* : Adengkra, Fairtsho, Foz ; *Gilbert Islands* : Bengibeng ; *Guam* : Kilulu, Quilulu ; *Gujerati* : Bendi, Bhindi, Parasapiplo ; *Hawaii* : Milo ; *Hindi* : Bhendi, Gajadanda, Gajhand, Parashajhad, Paraspipal, Parispipul, Parsipu, Pipal, Pippul, Porush ; *Honduras* : Cork Tree ; *Hova* : Valo ; *Indo-China* : Chrey sramol, Tra bo de, Tra bua, Tra lam vo ; *Konkani* : Benddy, Maner ; *La Reunion* : Porcher ; *Malay* : Baru, Buah keras laut ; *Malayalam* : Chandamaram, Chilanti, Kallal, Pupparutti, Puvarasu, Puvvarasha ; *Marathi* : Bendi, Bhenda, Bhendi, Paraspipar, Parsachajhada, Ranbhendi ; *New Caledonia* : Bois de rose, Daleni, Kabaoui ; *Nzima* : Eijan ; *Ponape* : Pana, Pena, Pona ; *Porebunder* : Paraspiplo ; *Porto Rico* : Palo de jagueca ; *Portuguese* : Pau rosa, Pau de rosa ; *Punjab* : Paharipipal, Paraspipal ; *Rarotonga* : Miro ; *Sakalave* : Valomena ; *Samoa* : Milo ; *Sanskrit* : Gardabhanda, Kamandalu, Kandarala, Kapichuta, Kapitana, Kuberaksha, Kundah, Nandi, Parisha, Phalisha, Suparshvaka ; *Sinhalese* : Gansurigaha, Suriya, Suriyagaha ; *Sunderbunds* : Dumbla ; *Tagalog* : Baboigubat, Babuy, Banalo, Boboigubat, Bubuygubat, Malasantol, Malibago ; *Tahiti* : Milo ; *Tamil* : Kallal, Piram, Pupparutti, Puvarasu ; *Telugu* : Gangaravi, Gangareni, Munigangaravi ; *Tonga* : Milo ; *Tulu* : Jogi, Jogiyattasa ; *Twi* : Ayedru, Benorsenya ; *Uriya* : Gunjausto, Habali, Porosopippoli ; *Visayan* : Bulacan ; *Yap* : Bonabeng.

Malvaceae.

The Mallow family is more especially tropical, diminishing rapidly as they recede from the equator, and the members are more numerous in the northern tropics and in America than in the Old World. Among ornamental trees may be mentioned *Thespesia* and *Kydia*.



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ACC No.....3196

ಗ್ರಂಥಾಲಯ
ಲಾಲ್‌ಭಾಗ್, ಬೆಂಗಳೂರು

ಡಾ॥ ಎಂ.ಹೆಚ್.ಮರೀಗೌಡ ರಾಷ್ಟ್ರೀಯ ಗ್ರಂಥಾಲಯ

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ಪ.ಸಂಖ್ಯೆ:.....3569..... ವ.ಸಂಖ್ಯೆ:.....

ಗ್ರಂಥ ಹಿಂದಿರುಗಿಸುವ ದಿನಾಂಕ ಚೀಟಿ

ಈ ಕೆಳಗೆ ಕಾಣಿಸಿರುವ ದಿನದಂದು ಅಥವಾ ಅದಕ್ಕೂ ಮುಂಚೆ ಈ ಪುಸ್ತಕವನ್ನು ಹಿಂದಿರುಗಿಸಬೇಕು. ಅಥವಾ ಮುಂಚಿತವಾಗಿ ನವೀಕರಿಸಬೇಕು. ಇಲ್ಲದಿದ್ದರೆ ಒಂದು ದಿನಕ್ಕೆ ರೂ.1.00 ದಂಡ ಕೊಡಬೇಕಾಗುತ್ತದೆ.

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ಮು.ತಿ.ನೋ..

ವ. ಸಂಖ್ಯೆ ----------

ತೋಟಗಾರಿಕೆ ಇಲಾಖೆಯ
ಗ್ರಂಥಾಲಯ

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